Appendix A:
Remedial Action Work Plan

REMEDIAL ACTION (RA) WORK PLAN

WAUCONDA SAND AND GRAVEL LANDFILL
WAUCONDA, ILLINOIS

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1.0 INTRODUCTION

This Remedial Action Work Plan (RAWP) describes the remedial actions associated with the Remedial Action/Cost Recovery Consent Decree (CD) for the Wauconda Sand & Gravel Superfund Site (Site) and the procedures for implementing them. A schedule for implementation is also included.

The following figures present the features of the landfill and surrounding area:

- Figure 1.1 - Site Location
- Figure 1.2 - General Site Plan
- Figure 1.3 - Detailed Site Plan
- Figure 1.4 - Location of Geologic Cross Section
- Figure 1.5 - Geologic Cross Section
- Figure 1.6 - Upper Aquifer Groundwater Contours
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- Figure 1.8 - Surface Draining Flow Patterns

2.0 REMEDIAL AND OTHER RESPONSE ACTIONS

The Settling Defendants shall implement the remedial and other actions in accordance with the Operation and Maintenance Plan (O&M Plan); Sampling, Analysis and Monitoring Plan (SAMP); Quality Assurance Project Plan (QAPP); and the Health and Safety Plan (HASP). In the event that the provisions of the RAWP and the provisions of the other plans identified above do not agree, the provisions of the RAWP shall prevail.

Remedial and other actions at the landfill include the following:

- landfill cap and security;
- leachate collection system;
- landfill gas/passive gas venting system;
- groundwater monitoring/monitored natural attenuation; and
- connections to the Wauconda water system.

2.1 LANDFILL CAP AND SECURITY

When the landfill was closed in 1978, a clay cap was completed with a typical thickness between 2 and 4 feet covered by six inches of topsoil to promote vegetation. Investigations indicated several localized areas where the cap thickness was less than 2 feet. These areas were addressed by a landfill cap upgrade program conducted in 1992 to augment the existing landfill cap to bring it up to a minimum thickness of two feet of soil.

The Settling Defendants shall maintain the landfill cap to minimize erosion from reducing the cap effectiveness to less than the effectiveness from two feet of compacted suitable material. For cap repairs, 24 inches of silt/clay (containing a minimum of 30% clay and no more than 25% sand and gravel) and 6 inches of vegetated topsoil shall be used.

The existing surface water drainage system consists of eight drainage swales at various areas of the landfill, and a culvert pipe that drains the central portion of the landfill. The Settling Defendants shall maintain the rip-rap and swales free of vegetation that would adversely affect their effectiveness. The Settling Defendants shall pressure test the culvert pipe for leaks every two years.

Access roads have been constructed for the landfill. The principal access road is constructed with gravel and is the most commonly used road. Other roads located at the landfill are constructed of clay. The Settling Defendants shall maintain and repair these roads as needed. The Settling Defendants shall conduct snow removal from access roads.

The perimeter of the landfill has been secured with a 6-foot high, industrial-type, chain-link fence. Various access gates for vehicles and personnel are located along the length of the fence. All gates are kept locked and keys are maintained by the Village of Wauconda, Site Custodian, and CRA. The Settling Defendants shall maintain the fence and gates to control unauthorized access.

Monthly and quarterly inspections of the landfill cap shall be performed by the Settling Defendants. Inspections shall be conducted by the Settling Defendants according to the guidelines established in the O&M Plan. The Settling Defendants shall provide the results of these inspections in progress reports.

A detailed inspection of the landfill cap shall be performed by the Settling Defendants in the early spring of the year, after snow no longer covers the landfill and before growth of vegetation obscures the ground surface. A second detailed inspection shall be conducted in late summer after mowing. Monthly inspections conducted during the summer and fall months shall specifically address the presence of desiccation cracks and stressed vegetation. The Settling Defendants shall conduct inspections according to the guidelines established in the O&M Plan. The Settling Defendants shall inspect the entire landfill cap for deficiencies, such as cracks, depressions, exposed refuse, and erosion damage, and for landfill gas odor emissions. The Settling Defendants shall complete the detailed inspections by walking the landfill cap using a 75-foot grid pattern or by mechanized travel using an open-cab style, off-road vehicle using a grid pattern of no greater than 25-foot spacing. The Settling Defendants shall mark minor landfill cap deficiencies in the field for repairs. Deficiencies not repaired within 60 days following the inspection shall be documented in the inspection report by the Settling Defendants, including schedules for correcting any problems discovered as a result of the inspection. The Settling Defendants shall correct the problems discovered as a result of the inspection within 180 days of the inspection. The Settling Defendants shall provide the results of the detailed inspections in the next Quarterly Report following the inspection.

If, at any time or as a result of these inspections, USEPA determines that repairs or replacement of the landfill cap are necessary due to flooding, settling, or other problems, the Settling Defendants shall submit a plan to repair or replace the cap to USEPA within

30 days of USEPA's determination and notice of the incident. The plan shall identify the repairs needed and provide a design and schedule for the repairs. The design, along with its schedule for implementation, shall be approved or modified by USEPA. Upon approval, the Settling Defendants shall implement the plan.

The Settling Defendants shall maintain the fence and gates around the landfill to prevent unauthorized access to the landfill. The Settling Defendants shall inspect the fence and gates monthly and within 10 days of discovery, repair or replace the fence and gates as necessary to prevent unauthorized access to the landfill.

2.2 LEACHATE COLLECTION SYSTEM

Mutton Creek flows in close proximity to the north boundary of the landfill as shown on Figure 1.3. Prior to 1987, it was reported that leachate seepage from the landfill occasionally reached Mutton Creek.

Since November 1987, leachate has been collected from the landfill via a leachate collection system (LCS). The LCS is designed to intercept and remove leachate from the landfill's north slope. Portions of the LCS were originally constructed in 1987 and an upgrade of the system was completed in 1991. The LCS consists of three components:

- A gravity flow collection system across the north end of the landfill connecting to a pumping chamber at the west side of the landfill;
- A transfer forcemain from the pumping chamber along the west boundary of the landfill connecting to the Village of Wauconda sanitary manhole 12-24 on Bonner Road; and
- A backup forcemain from the pumping chamber running parallel to the collection system connecting to an aboveground storage facility located at the northeast corner of the landfill.

Three leachate monitoring wells (LW501, LW502, and LW503) and a leachate manhole are located within the landfill and are used to monitor leachate levels.

The Settling Defendants shall operate the LCS, by pumping leachate to the Village's sanitary sewer via manhole 12-24 on Bonner Road under a permit issued by Illinois EPA. In the event that collected leachate would exceed permit limits, leachate shall be transferred by the Settling Defendants to the aboveground storage tank temporarily until it can be returned for discharge to the Village's manhole 12-24. As a contingency to

the above, the Settling Defendants may remove the leachate from the aboveground storage tank with a licensed liquid special waste haulage vehicle for disposal at the CID Disposal Facility in Calumet City, Illinois.

The operational condition of the collection system shall be inspected three times per week and leachate flow rates shall be recorded three times per week by the Settling Defendants. A general inspection of the LCS storage area shall be performed on a monthly basis by the Settling Defendants. Quarterly and annual inspections of the entire LCS shall be performed by the Settling Defendants, in accordance with the O&M Plan. Results of the monthly and quarterly LCS inspections shall be provided in the progress reports, by the Settling Defendants. Results of the annual LCS inspections shall be included in the Annual Monitoring Report by the Settling Defendants. If, at any time or as a result of these inspections, USEPA determines that repairs or replacement of the LCS are necessary, a plan to repair or replace the LCS shall be submitted by the Settling Defendants to USEPA within 30 days of USEPA's determination and notice of the incident. The plan shall identify the repairs needed and provide a design and schedule for the repairs. The design, along with its schedule for implementation, shall be approved or modified by USEPA. Following USEPA approval, the Settling Defendants shall then implement the plan.

2.3 LANDFILL GAS

2.3.1 PASSIVE GAS VENTING SYSTEM

The landfill gas passive venting system consists of ten centrally located passive gas vents (GV-1 through GV-10) and eight perimeter passive gas vents (GV-11 through GV-18). The central gas vents are installed through the entire waste thickness (approximately 40 feet). The perimeter gas vents are installed approximately 10 feet into the waste and serve to mitigate off-site subsurface gas migration. The Settling Defendants shall continue to operate and maintain the on-site passive landfill gas venting system.

The passive landfill gas venting system shall be inspected by the Settling Defendants, in accordance with the O&M Plan, during the annual site inspection. The Settling Defendants shall include the results of the gas vent inspection in their Annual Monitoring Report submitted to USEPA.

If, at any time or as a result of these inspections, USEPA determines that repairs or replacement of the passive venting system are necessary due to flooding, settling or

other problems, the Settling Defendants shall submit to USEPA a plan to repair or replace the passive landfill gas venting system within 30 days of USEPA's determination and notice of the incident. The plan shall identify the repairs needed and provide a design and schedule for the repairs. The design, along with its schedule for implementation, shall be approved or modified by USEPA. Upon approval, the Settling Defendants shall implement the plan.

2.3.2 SOIL GAS PROBES

Two sets of nested soil gas probes (GP1-A/B, and GP2-A/B) are located along Bonner Road. Each nested probe consists of one probe screened below the surficial clay unit, and a second probe screened at least 2 feet below the shallow screen. These probes were installed in areas previously identified with off-site, subsurface landfill gas. A description of the soil gas monitoring program is presented in Section 4.0.

The Settling Defendants shall inspect the soil gas probes, during the monthly sampling described in the O&M Plan. Results of the soil gas inspection shall be included in the Progress Reports submitted by the Settling Defendants.

If, at any time or as a result of these inspections, USEPA determines that repairs or replacement of the soil gas probes are necessary, the Settling Defendants shall submit a plan to repair or replace the soil gas probes to USEPA within 30 days of USEPA's determination and notice of the incident. The plan shall identify the repairs needed and provide a design and schedule for the repairs. The design, along with its schedule for implementation, shall be approved or modified by USEPA. Upon approval, the Settling Defendants shall implement the plan.

2.3.3 COMBUSTIBLE GAS MONITORS

In May 1995, due to the detection of combustible gas in the off-site soil gas monitoring probes, the WTG offered to supply and install combustible gas monitors, as a precautionary measure, in the homes south of Bonner Road and in the businesses along Garland Road in the area southeast of the landfill. These monitors were installed in the two homes south of Bonner Road. The businesses along Garland Road (Berger Excavating, Hedgepath's Landscaping, Inc., and Murphy's Auto Parts (now defunct)) declined the offer. These combustible gas alarms were upgraded in 1997 to include battery back-up in case of power outage.

The Settling Defendants shall conduct periodic inspection and calibration of these monitors in accordance with manufacturer's recommendations or annually, whichever is more frequent.

2.4 GROUNDWATER MONITORING WELLS

Groundwater monitoring wells have been constructed around the landfill perimeter and off-site to monitor groundwater flow and quality, and natural attenuation. The location of each monitoring well and a description of the monitoring program are presented in Section 4.0. The Settling Defendants shall install groundwater monitoring wells as needed to monitor water levels and chemical concentrations. These additional monitoring wells, as described in Section 4.3, shall be installed within 180 days after the effective date of the CD.

No wells are to be installed into or through refuse in the landfill. Any wells installed in formations below the Upper Aquifer must be pressure grouted or backfilled with bentonite along the aquitard separating the Upper and Lower Aquifers according to a plan approved by USEPA, and implemented by the Settling Defendants, to prevent migration of contaminants from the Upper Aquifer to the Lower Aquifer.

The Settling Defendants shall inspect the groundwater monitoring wells whenever the wells are sampled. The Settling Defendants shall include the results of the monitoring well inspections in the Quarterly or Annual Progress Reports, as appropriate.

If, at any time or as a result of these inspections, USEPA determines that repairs or replacement of groundwater monitoring wells are necessary, the Settling Defendants shall submit a plan to USEPA within 30 days of receipt of notice of USEPA's determination. The plan shall identify the repairs or replacements needed and provide a design and schedule for the repairs. The design, along with its schedule for implementation, shall be approved or modified by USEPA. The Settling Defendants shall then implement the plan.

3.0 CONNECTION TO THE WAUCONDA WATER SUPPLY SYSTEM

The Public Water Supply Service Area as shown on Figure 3.1 and consisting of the Hillcrest, North Shore, Elmcrest, Wellsmere Heights, Spencer Highlands, Lakeview Villa, and Garland Road-South areas shall be connected by the Settling Defendants to the Village of Wauconda water supply system. This section provides a description of connection to the Public Water Supply System.

3.1 PROVISION OF BOTTLED DRINKING WATER

The Settling Defendants shall continue to provide bottled drinking water to residents within the Public Water Supply Service Area, as shown on Figure 3.1, and in the Garland Road – North area, between Bonner Road and Virginia Lane. The Settling Defendants shall provide bottled water to residents in the Public Water Supply System area until they are connected to the Wauconda water system or until they refuse to be connected.

The Settling Defendants shall continue to provide bottled water to residents in the Garland Road - North area for a period of five years from April 19, 2005, or until these homes are connected to the Wauconda water system, whichever is sooner. If vinyl chloride is not detected in these wells during the 5-year monitoring period, the delivery of bottled water by the Settling Defendants shall cease. If vinyl chloride is detected, the provisions of Section 6.2 shall apply to the well where the detection was measured.

3.2 CONNECTION TO THE WAUCONDA WATER SUPPLY SYSTEM

The Settling Defendants shall complete connections to the Wauconda water supply system as outlined below. The Settling Defendants shall make the connections in the areas shown on Figure 3.2. The Settling Defendants shall complete the water connection program in two phases.

Phase I

The first phase of the water connection program shall include the construction of water mains throughout the neighborhoods to supply water for consumption purposes, connection of each residence to the water mains, installation of individual water meters, and sealing of the resident's existing well. More detailed descriptions of the Phase I activities are described below:

- ***Hillcrest Subdivision:*** The Hillcrest subdivision lies within Wauconda Township and currently relies on private residential wells for water supply. Approximately 12,000 feet of water mains and 144 planned service connections shall be installed throughout the Hillcrest subdivision. The water mains would be installed within the street right-of-ways between the property line and street pavement. Water service connections shall be installed from the new water main to each of the homes.
- ***Lakeview Villa and North Shore Subdivisions:*** The Lakeview Villa and North Shore subdivisions lie within the Village of Wauconda and are currently serviced by Village water with an existing water main system. Approximately 58 planned service connections shall be installed throughout the Lakeview Villa subdivision and 7 planned service connections shall be made in the North Shore area. Water service connections shall be installed from the existing water main to each of the homes.
- ***Wellsmere Heights, Spencer Highlands, and Elmcrest Subdivisions:*** The Wellsmere Heights, Spencer Highlands, and Elmcrest subdivisions lie within Wauconda Township and currently rely on private residential wells for water supply. Approximately 13,000 feet of water mains and 166 service connections shall be installed throughout the Wellsmere Heights/Spencer Highlands/Elmcrest area. The water mains would be installed within the street right-of-ways. Water service connections shall be installed from the new water main to each of the homes.
- ***Garland Road - South:*** The area of Garland Road (south of Bonner Road) lies within Wauconda Township and is currently serviced by Village water with an existing water main system. Approximately 6 planned service connections shall be installed in the Garland Road – South area. Water service connections shall be installed from the existing water main to each of the homes.

In summary, the approximate total number of connections is 381.

Upon completion of all planned connections to the Wauconda water supply system, the Settling Defendants shall either seal or convert to a monitoring well each residential well location such that the well can no longer be used for water supply. Residential wells planned for closure shall be done so by an Illinois-licensed driller in accordance with the Illinois Water Well Construction Code (Section 920.120). The Settling Defendants shall determine prior to closure the depth to water and total well depth and shall report such data in the Remedial Action Completion Report.

Phase II

The second phase of the water connection program shall involve the construction of supporting infrastructure items needed to provide an adequate supply of water. These infrastructure items include an additional water supply well rated at least 250 gallons per minute (gpm) and water treatment.

It is important to note that there is enough reserve capacity in the existing infrastructure of the Village of Wauconda water supply system to allow the Phase I construction to be completed and operational. The Phase II items are needed to replace the lost reserve capacity of the Village of Wauconda's water supply system.

4.0 GROUNDWATER MONITORING

The Settling Defendants shall conduct a groundwater monitoring program in accordance with the QAPP, SAMP, and HASP.

This section describes groundwater elevation surveys to better define variations in groundwater flow and installing new monitoring wells and abandoning existing wells, and then describes the groundwater monitoring program, which consists of monitoring groundwater quality in three separate networks of monitoring wells. Basic elements of the groundwater monitoring program are presented in Table 4.1 and are described below. Additional investigative and feasibility tasks and further response actions stemming from monitoring are set forth in Section 6.2.

4.1 GROUNDWATER ELEVATION SURVEYS

Pre- and Post -Public Water Supply Connection Groundwater Elevation Surveys: In January 2006, the Settling Defendants, Tetra Tech, and USGS measured water levels in approximately 30 residential wells and monitoring wells. The Settling Defendants shall collect a second round of water levels from the 30 residential wells that were surveyed in January 2006 within 30 days prior to the installation of the perimeter monitoring wells. Results of the water level surveys shall be considered in situating the new monitoring wells discussed in Section 4.3, below. The Settling Defendants shall present the results of this groundwater elevation survey to USEPA and meet with USEPA to discuss whether the proposed locations for the new monitoring wells and the residential wells that shall be converted to monitoring wells (shown on Figure 4.1) remain appropriate considering the effects of reduced pumping from the residential wells.

Transition Groundwater Elevation Monitoring: This task is a one-time event and is not part of the long term monitoring program. The Settling Defendants shall monitor groundwater elevations with pressure transducers at 15 minute intervals for a 3-week period in two groups of wells. These two groups of wells shall include: (1) two residential wells at the time of transition from residential well water supply to municipal water supply (i.e. at the time when the residences cease deriving water from their residential wells and begin deriving water from the municipal water supply line) in an area where surrounding wells have not yet been turned off; and (2) three wells after the time of transition from residential well water supply to municipal water supply when most or all of the residences have been connected to a public water supply. The two wells to be monitored before most or all of the residences have connected to a public water supply should include lower aquifer wells in Hillcrest, one screened in bedrock

and one screened in the lower sand and gravel aquifer. The three wells to be monitored after most or all of the residences have connected to a public water supply should include: (1) one well near the North Garland wells to determine if pumping these wells affects water levels in the plume area; (2) one well in the Spencer Highlands/Elmcrest Area near the southern edge of the residential wells; and (3) one in the central or south-central part of the Hillcrest subdivision. The objective of this monitoring is to evaluate effects of cumulative residential pumping and municipal pumping on water levels in the aquifers during and after transition to the municipal water supply. The results of the monitoring shall be used to evaluate the effects of pumping on water levels in the previous water supply aquifers and appropriateness of proposed sites for new monitoring wells. The Settling Defendants shall report the results of the transition monitoring to USEPA for evaluation before the new monitoring wells described in Section 4.3 are installed. The Settling Defendants shall also report the results of the transition monitoring in the Hydrogeologic Assessment Report (see Section 5.2).

Periodic Groundwater Elevation Surveys: The Settling Defendants shall conduct groundwater elevation surveys concurrently with each of the scheduled sampling events described in Section 4.6 below. Water levels in each well shall be measured by the Settling Defendants before sampling, and water levels in all wells included in the monitoring event shall be measured in a single day. Groundwater elevations shall be measured synoptically in the Perimeter Monitoring Network and the Upper Aquifer Monitoring Network to allow a comprehensive evaluation of groundwater flow patterns and relationships between the two aquifers. Water levels in all wells included in the Perimeter and the Upper Aquifer Monitoring Network shall be measured semi-annually. Where multiple monitoring networks are included in the same monitoring event, water levels in all wells included in the networks shall be measured on the same day. The dates of quarterly and annual monitoring events shall be synchronized so that the events coincide to the extent possible, rather than staggering the events.

Two or three rounds of water levels will be collected from residential wells prior to well closure.

Whenever groundwater elevation surveys are conducted in the Upper Aquifer Monitoring Network, the Settling Defendants shall determine the groundwater elevations at all Upper Aquifer monitoring wells, including those wells that will not be sampled.

The Settling Defendants shall provide groundwater elevation data and groundwater potentiometric surface maps in the Quarterly and Annual Monitoring Reports.

4.2 VERTICAL AQUIFER PROFILING

Vertical Aquifer Profiling (VAP) will be conducted at the three locations illustrated on Figure 4.1. Boreholes will be advanced to collect discrete groundwater samples from the Lower Aquifer/Bedrock Aquifer to select the appropriate monitoring well screen interval.

VAP boreholes will be drilled using a 6-inch diameter rotosonic drill. A minimum of three samples in total will be collected from the Lower Sand Aquifer and Bedrock Aquifer. However, only one well will be installed at each location. VAP samples will be collected over 10-foot intervals.

Discrete VAP groundwater samples will be collected using a temporary well screen, sampling pump, and inflatable packer system to isolate the VAP sample interval. Once the desired sample depth is reached, the screen will be placed at the bottom of the borehole and the casing will be pulled back to expose the screen. Prior to sampling, water in the borehole will be pumped out to remove a minimum of three times the volume of water introduced during drilling[1], plus three times the well volume (drilling methods will be modified to minimize the amount of water introduced during drilling). While purging, the water level will be monitored and the drawdown will be minimized. After the initial well purging, an inflatable packer system will then be placed at the top of the screen. Once the packer is inflated, a pump will be lowered inside of the screen. Low flow groundwater purging techniques will be utilized in general accordance with USEPA guidance[2]. Purging will be conducted at a steady flowrate of approximately 500 milliliters per minute (mL/min.) so that a stable groundwater level drawdown of 0.3 feet or less is observed. Each sample will be collected with a bladder pump or submersible pump capable of pumping at 250 to 500 mL/minute. New discharge tubing will be used for each sample.

Before initiating well stabilization measurements, a minimum of 10 L of water will be purged from the well at a flow rate of 0.5 L/min. or less. Approximately every five minutes during the purging process, the following field parameters will be measured and recorded: pH, temperature, conductivity, dissolved oxygen (DO), turbidity, and

1 Volume of water introduced during preceding drill run, this excludes water removed from earlier samples.

2 Puls, Robert W. and Barcelona, Michael J., Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, USEPA Office of Solid Waste and Emergency Response, EPA/540/S-95/504, April 1996.

redox potential (Eh). Field instruments will be calibrated daily at the beginning of the day in accordance with manufacturer's specifications. Purging will continue until there is stabilization based on three consecutive readings within the following ranges:

+/- 0.1 for pH
+/- 10% for temperature
+/- 3% for conductivity
+/- 10% for DO and turbidity
+/- 10 mV for redox potential (Eh)

Once stabilized, the sample will be collected at a flow rate of 250 mL/min.

In the event that these stabilization criteria cannot be met, three borehole volumes will be purged from the well before groundwater samples are collected.

After sample collection, the samples will be placed in coolers with ice and transported to the laboratory for 24-hour turn-around laboratory analysis under standard chain-of-custody procedures. All VAP samples will be analyzed for VOCs using USEPA method 8260.

Analytical results will be reviewed with USEPA's field representative as the results are received. Based on the results of the VAP samples, the Settling Defendants and the USEPA will mutually agree on the appropriate well screen interval.

4.3 NEW MONITORING WELLS

Once groundwater flow patterns have been confirmed based upon the groundwater elevation data received from the residential wells (transitional groundwater elevation monitoring and pre- and post-public water supply connection groundwater elevation surveys), the Settling Defendants shall complete the following activities:

- Install three new Lower Aquifer monitoring wells to the east and the south of the Public Water Service Area. The approximate locations selected for monitoring well installation are shown on Figure 4.1. These monitoring wells shall be installed within 180 days after the effective date of the CD. These wells will be screened in the upper part of the bedrock similar to MP1-MP4.
- Conduct vertical aquifer profiling at three locations south and southwest of the water service area. Upon completion of vertical aquifer profiling, one Lower Aquifer Perimeter Monitoring Network well per VAP location shall be installed at the

preferred depth, after consultation with EPA. The well screen or open interval elevation of the respective municipal well shall be considered during the vertical profiling effort and when the screened interval of the permanent well is determined. The approximate locations selected for the vertical aquifer profiling and new wells are shown on Figure 4.1.

- Newly installed monitoring wells shall be logged under the supervision of a licensed Illinois Professional Geologist, and lithologic logs and monitoring well construction details shall be provided to USEPA in the Quarterly Report for whichever quarter the wells are installed.
- Convert four residential wells (two in the Hillcrest subdivision, one in the North Shore subdivision, and one in the Wellsmere Area) to Lower Aquifer Perimeter Monitoring network wells. The approximate locations selected for conversion to monitoring wells are shown on Figure 4.1. Residential well conversions shall be completed within 180 days after the effective date of the CD.
- Survey top of casing elevations. The Settling Defendants shall hire an Illinois-certified land surveyor to survey the location and top of casing elevations of the newly installed Perimeter Monitoring Network wells and converted residential wells within 30 days of well installation and conversion.
- The Settling Defendants shall provide lithologic logs, geophysical logs, top of casing elevations, and well construction details to USEPA in the monthly report for the month when the drilling, logging, and surveying occurs.
- The procedures for drilling, installation, construction, development of the new monitoring wells and techniques for conversion of residential wells to monitoring wells will be discussed in a supplement to the SAMP. This supplement will be submitted to USEPA within 90 days after the effective date of the CD.

Well installation procedures and proposed screened intervals shall be discussed in the SAMP.

4.4 OTHER TASKS

In addition to the water level elevation surveys, vertical aquifer profiling, installation of new monitoring wells, and conversion of residential wells to monitoring wells described above, the Settling Defendants shall complete the following activities:

- Following completion of the planned water service connections to the Wauconda water system and well decommissioning (removal of well pump and

appurtenances), the depth to groundwater and the total well depth shall be determined at every accessible well location by the Settling Defendants. The well depth and water level shall be measured after the pumps and piping are removed. Most of the wells will have a temporary locking cap and the sealing task will be conducted at a later date. This will allow time to select locations for water level monitoring. The Settling Defendants shall collect these groundwater level measurements within approximately 90 days following completion of all water service connections. The synoptic water level surveys will use representative well locations in each subdivision. These locations will be selected with USEPA based on well information that is developed after pulling the pumps and piping.

- The four residential wells which shall be converted to Lower Aquifer Perimeter Monitoring Network wells shall be geophysically logged (natural gamma and, if appropriate, caliper logs) by the Settling Defendants to evaluate the geology at the well location and at the well screen or open interval. In addition, the Settling Defendants shall better define the dimensions of the area where the middle clay unit is missing by geophysically logging at least 10 wells in Hillcrest and at least 5 wells in the Wellsmere area.
- Single well aquifer tests shall be performed on all newly installed monitoring wells within 30 days of well installation. Falling head and/or rising head tests shall be analyzed by the Settling Defendants to ascertain hydraulic conductivity values at those specified locations.

4.5 MONITORING WELL CLOSURES

As previously approved by USEPA in a letter dated September 9, 2003, the following monitoring wells shall be closed by the Settling Defendants: G103, G106, G117, G302, G303A, G303B, and G304. The basis for closure of each of these wells was submitted to USEPA in letters dated March 22 and May 23, 2002. These wells are considered obsolete because the wells are poorly constructed, are in disrepair, and are no longer being used for water quality or groundwater elevation determination. The Settling Defendants are to complete closure within 180 days after the effective date of the CD.

In addition, monitoring wells OW402 and G311B shall also be closed by the Settling Defendants. Monitoring well OW402 is located several feet from the edge of a deep quarry making sampling of this well a safety issue. Monitoring well G311B has been damaged to the point where water level information cannot even be determined. Neither of these wells is planned for future monitoring and, thus, these wells shall not be replaced.

The locations of these monitoring wells are shown on Figure 4.2. The Settling Defendants shall ensure that these wells are closed by an Illinois-licensed well driller in accordance with the Illinois Water Well Construction Code (Section 920.120).

The Settling Defendants shall hire an Illinois-certified land surveyor to survey the location and top of casing elevations of the residential wells scheduled for closure.

4.6 GROUNDWATER MONITORING PROGRAM

Groundwater monitoring shall consist of monitoring the Perimeter Monitoring Network and the Upper Aquifer Monitoring Network, and the Garland Road – North Residential Well Sampling Program. Each of these groundwater monitoring programs is discussed in the following sections.

4.6.1 PERIMETER NETWORK MONITORING PROGRAM

After the connections to the Wauconda water system are completed, the Settling Defendants shall establish a Perimeter Monitoring Network and initiate a Perimeter Network Monitoring program as follows:

Perimeter Monitoring Network Wells: The Settling Defendants shall establish monitoring wells around the perimeter of the water supply service area and sentry wells upgradient of Village of Wauconda Municipal Wells 2, 3, 5, and 6. The Perimeter Monitoring Network shall include the following wells:

- Three Lower Aquifer monitoring wells newly installed by the Settling Defendants;
- Three Lower Aquifer monitoring wells located at the vertical aquifer profiling locations newly installed by the Settling Defendants;
- Four residential wells converted by the Settling Defendants into monitoring wells; and
- Eight existing Lower Aquifer Monitoring Wells (OW409, OW410, OW417, OW421, MP1, MP2, MP3, and MP4).

The proposed Perimeter Monitoring Network is shown on Figure 4.1. The final well locations shall be approved by USEPA.

Perimeter Monitoring Network Sampling Program: The Settling Defendants shall collect groundwater samples from the Perimeter Monitoring Network monitoring wells (shown on Figure 4.1) for analysis of volatile organic compounds (VOCs) and MNA parameters in accordance with USEPA MNA protocols and guidelines presented in "Region 5 Framework for Monitored Natural Attenuation Decisions for Ground Water (USEPA 2000)" and as presented in the SAMP.

The Settling Defendants shall measure groundwater elevations in each of the Perimeter Monitoring Network wells in a single day before sampling the wells during each of the Perimeter Monitoring Network sampling events.

The Settling Defendants shall conduct Perimeter Monitoring Network groundwater sampling on a quarterly basis for Years 1 and 2 after entry of the CD. After 2 years and again after 5 years, the USEPA shall determine the scope and frequency of future monitoring and the Settling Defendants shall implement that determination.

The Settling Defendants shall provide results from the Perimeter Monitoring Network sampling events in the Quarterly and Annual Monitoring Reports, as appropriate.

4.6.2 UPPER AQUIFER GROUNDWATER MONITORING PROGRAM

The Settling Defendants shall establish an Upper Aquifer Monitoring Network and initiate an Upper Aquifer Network Monitoring program.

Upper Aquifer Monitoring Network Wells: The Upper Aquifer groundwater monitoring network shall consist of monitoring wells G305B, OW406, OW407, OW408, OW412, OW413, OW415, OW416, OW418, and OW420 as presented on Figure 4.3 and as listed on Table 4.1. These locations may be modified in the future with USEPA approval.

Upper Aquifer Monitoring Network Sampling Program: The Settling Defendants shall collect groundwater samples from the Upper Aquifer Monitoring Network (shown on Figure 4.3) for analysis of VOCs and groundwater quality parameters in accordance with the protocols presented in the SAMP. The Settling Defendants shall collect groundwater samples from Upper Aquifer Monitoring Network wells OW406, OW412, OW415, and OW416 for analysis for MNA parameters. The Settling Defendants shall collect groundwater samples from Upper Aquifer Monitoring Network well OW413 for analysis of metals. Samples shall be collected annually beginning the first year after entry of the CD. After 2 years, and again after 5 years, the USEPA shall determine the

scope and frequency of future monitoring and the Settling Defendants shall implement that determination.

The Settling Defendants shall measure groundwater elevations in each of the Upper Aquifer Monitoring Network wells in a single day during each of the Upper Aquifer Monitoring Network sampling events.

The Settling Defendants shall provide results from the Upper Aquifer Monitoring Network sampling events in the Annual Monitoring Reports.

4.6.3 RESIDENTIAL WELL MONITORING PROGRAM

The Settling Defendants shall establish a Residential Well Monitoring Network and initiate a Residential Well Network Monitoring program.

Residential Well Monitoring Network Wells: The residential well monitoring network shall consist of the following 12 residential wells located along Garland Road between Virginia Lane and Bonner Road (the Garland Road - North wells), the Hedgepath well, and five additional residential wells in the Wauconda area selected by USEPA:

- 28855 Garland Road (GD855);
- 28871 Garland Road (GD871);
- 28893 Garland Road (GD893);
- 28911 Garland Road (GD911-2);
- 28941 Garland Road (GD941);
- 28975 Garland Road (GD975);
- 28979 Garland Road (GD979);
- 28985 Garland Road (GD985);
- 29031 Garland Road (GD031);
- 29065 Garland Road (GD065);
- 29097 Garland Road (GD097);
- 29237 Garland Road (GD237); and
- 1207 Garland Road (Hedgepath well).

Locations of the 13 wells listed above are shown on Figure 4.4.

***Residential Well Network Sampling Program*:** Sampling of the Garland Road – North wells shall be conducted quarterly by the Settling Defendants. Twenty-five per cent of the Garland Road - North wells (shown on Figure 4.4) shall be sampled during each quarterly monitoring event, so that each of the twelve wells is sampled once per year by the Settling Defendants. Selected residential locations may be rotated or repeated during subsequent monitoring rounds, as determined by USEPA and the Settling Defendants. The Settling Defendants shall collect samples for analysis of VOCs and general water quality parameters. The Settling Defendants shall conduct groundwater sampling in accordance with protocols presented in the SAMP.

The Settling Defendants shall also conduct semi-annual groundwater sampling at GD207 (Hedgepath well). Routine groundwater sampling of GD207 was initiated in May 1999 as part of an Interim Water Supply Plan. The Settling Defendants shall collect samples for analysis of VOCs and groundwater sampling at this well shall be conducted in accordance with protocols presented in the SAMP.

Further, USEPA shall select five additional residential wells to be sampled annually for VOCs as part of the Residential Well Network Sampling Program that the Settling Defendants shall conduct. If the Garland Road - North residents refuse to connect to an alternate water supply offered by WTG or by the Village of Wauconda, those wells shall be included in the pool of residential wells from which five shall be selected for the residential sampling program. These additional residential wells shall be sampled annually on the same schedule as the Garland Road residential wells but the duration of the sampling shall extend beyond 2010.

If a hazardous substance is detected in a Residential Well Monitoring Network well other than the Hedgepath well, then the Settling Defendants shall follow the requirements set out in Section 6.2, subparagraph 3, for further action.

The Garland Road – North Residential Well Sampling Program shall continue until April 19, 2010 or until each of the twelve Garland Road - North residences are provided with a permanent uncontaminated water supply (or until one is offered and refused by the resident). If vinyl chloride is not detected during this sampling program, the sampling program shall cease in 2010. If the twelve Garland Road - North residences still obtain water from private wells at this time, these wells shall become part of the pool of residential wells from which five residential wells are selected by USEPA each year for ongoing annual sampling by the Settling Defendants.

The Settling Defendants shall conduct semi-annual sampling of GD207 for a period of five years, or until this business has been connected to a permanent uncontaminated water supply, whichever occurs first. If, at the end of the five-year monitoring period, vinyl chloride continues to be detected, an evaluation shall be made and a recommendation provided by the Settling Defendants for addressing the issue. The USEPA shall take the recommendation into consideration and decide the course for future action at GD207. The Settling Defendants shall implement whatever monitoring of well GD207 USEPA deems appropriate.

The Settling Defendants shall provide results from the quarterly sampling events to the respective residents, in the quarterly progress reports, and in the Annual Monitoring Reports.

In addition, the residential well sampling work plans previously required and approved by USEPA, and the work performed thereunder and the results reported to USEPA, are expressly incorporated herein and made a part of this RAWP and are enforceable hereunder.

4.7 MUTTON CREEK (SURFACE WATER) MONITORING

If an observable release of leachate into Mutton Creek has occurred, the Settling Defendants shall communicate the observed release promptly to USEPA, and shall document the release in the monthly progress report for the month the release was observed. The Settling Defendants shall collect surface water and sediment samples upstream from the landfill and upstream and downstream from the location of the observed release. The Settling Defendants shall sample in accordance with the SAMP. The Settling Defendants shall collect samples within 5 days of the observed release and analyze for those parameters specified in the current Illinois EPA discharge permit for leachate to the Village sanitary sewer system. The Settling Defendants shall repeat sampling every seven days until the release subsides.

The Settling Defendants shall include sample results from Mutton Creek in the quarterly progress reports.

4.8 LEACHATE COLLECTION SYSTEM MONITORING

4.8.1 LANDFILL LEACHATE LEVEL MONITORING

The Settling Defendants shall measure and record leachate levels in the leachate manhole at the southern limit of the landfill, and the three leachate monitoring wells monthly, in accordance with the O&M Plan. The Settling Defendants shall include leachate levels in the leachate monitoring wells in the Annual Monitoring Report and Progress Reports.

4.8.2 LEACHATE COLLECTION SYSTEM MONITORING

The Settling Defendants shall conduct sampling of the leachate as required by permits issued by Illinois EPA for discharge of leachate to the Village of Wauconda sanitary sewer system. The Settling Defendants shall provide the results of leachate sampling in letter reports, as required.

4.9 SOIL GAS MONITORING

Soil gas probe monitoring for determination of combustible gas levels and gas pressure shall be conducted at soil gas monitoring probes GP-1A/B and GP-2A/B by the Settling Defendants. Monitoring of these soil gas probes shall be conducted by the Settling Defendants on a monthly basis and in accordance with the SAMP.

As part of each monitoring event, the Settling Defendants shall measure the gas pressure and combustible gas concentrations at each probe along with the weather conditions at the time of monitoring and make a record in a sample log. The results of soil gas monitoring shall be provided by the Settling Defendants in monthly reports.

4.10 STRUCTURE VAPOR EVALUATION

The Settling Defendants shall use the Johnson-Ettinger model to assess potential indoor vapor concentrations for the Hillcrest, Wellsmere, Spencer Highlands, North Shore, Lakeview Villa, Elmcrest, South Garland, and North Garland (including the businesses on Garland Road and Bonner Road) areas. The Settling Defendants shall submit a Structure Vapor Evaluation technical memorandum describing the methodology and results of the Johnson-Ettinger model within 180 days of the effective date of the CD. USEPA will use the technical memorandum to decide if any follow-up action is necessary by the Settling Defendants.

5.0 REPORTING

The reports described in this section shall be submitted by the Settling Defendants to USEPA and Illinois EPA.

5.1 REMEDIAL ACTION COMPLETION REPORT

The Settling Defendants shall prepare a Remedial Action Completion Report per paragraph 49 of the CD.

5.2 HYDROGEOLOGIC ASSESSMENT REPORT

Extensive data on hydrogeology, groundwater flow patterns, and groundwater quality in and around the Wauconda landfill has been included in previous reports. Additional data shall be collected by the Settling Defendants during the investigations described in this RAWP, including vertical aquifer profiling data, aquifer tests, pre- and post-public water supply connection groundwater elevation surveys and transitional water level monitoring described in Section 4.1, lithologic, geophysical, and well construction data from new and existing wells, and new contaminant concentration data from the residential, perimeter, and upper aquifer monitoring networks.

The Settling Defendants shall prepare a Hydrogeologic Assessment report that shall present new geologic and hydrogeologic data gathered under this RAWP, shall characterize the nature and extent of contamination, and shall evaluate threats to downgradient receptors based on existing data and data collected from the residential, perimeter, and upper aquifer monitoring networks. The hydrogeologic assessment report shall present a variety of data, including the results of the vertical aquifer profiling, water level data from homes newly connected to the municipal water system, and new contaminant concentration data, and shall recommend whether the currently proposed perimeter monitoring network requires modification based on these data. The Hydrogeologic Assessment report shall also evaluate potential water quality threats from the contaminant plume to potential receptors that are not currently exposed to contaminated water, including a projection of future plume movement, contaminant transport rates, identification of potential downgradient receptors, and an assessment of vulnerability of potential downgradient receptors within and outside the perimeter monitoring network to contamination. The Hydrogeologic Assessment report shall be submitted to USEPA within 180 days of the entry of the CD.

Because the timing of this report is contingent on the availability of analytical results from the residential, perimeter, and upper aquifer monitoring networks, the Settling Defendants shall monitor these networks during the first quarter after entry of the CD. The Settling Defendants shall provide the report within 180 days of the effective date of the CD. Further, because the locations and screened intervals of newly installed wells shall be contingent on the results of the vertical aquifer profiling and water levels, results of the aquifer profiling and water level monitoring shall be submitted by the Settling Defendants to USEPA along with recommendations of well locations and screened intervals before the new wells are installed.

5.3 STRUCTURE VAPOR EVALUATION MEMORANDUM

The Settling Defendants shall prepare a technical memorandum summarizing the structure vapor modeling effort within 180 days of the effective date of the CD.

5.4 LEACHATE MONITORING REPORTING

The Settling Defendants shall include leachate levels in leachate monitoring wells in the progress reports and the Annual Monitoring Report.

5.5 MONTHLY REPORTS

Activities conducted on a monthly basis shall be reported by the Settling Defendants on the 10th day of the following month (for the period of time that monthly reports are required)

5.6 QUARTERLY PROGRESS REPORTS

Activities conducted on a quarterly basis shall be reported by the Settling Defendants by the tenth day of January, April, July, and October of each year, covering the previous three months, which shall include, but not be limited to:

- A summary of work completed and noted events during the quarter;
- Any data, including analytical data for groundwater or soil gas, hydrogeologic data, water levels, and lithologic data generated by the Settling Defendants during the quarter;

- Copies of the monthly reports for the quarter; and
- A summary of work anticipated to be completed during the upcoming quarter.

5.7 ANNUAL MONITORING REPORT

The Settling Defendants shall submit an annual monitoring report by December 1 of each year, covering activities from November 1 of the preceding year, to October 31 of the reporting year, and shall include:

- A summary of monitoring activities;
- A tabulation of data obtained;
- An assessment of data quality;
- A comparison of WTG results with relevant standards;
- The results of water quality sampling from the Village of Wauconda municipal water supply wells;
- A calculation of the total estimated carcinogenic risk level at each well using the most recent potency factors determined by the USEPA Environmental Criteria and Assessment Office or the Carcinogen Assessment Group;
- Groundwater potentiometric surface maps;
- Leachate sampling results;
- A status report on landfill cap inspections; and
- An evaluation as to whether further remedial actions are necessary.

6.0 PLAN REVISIONS

6.1 FIVE-YEAR UPDATES

Within 90 days after USEPA has completed the 5-Year Reviews of the Site, updates of the following plans shall be revised and submitted by the Settling Defendants to USEPA and the Illinois EPA, as necessary:

- O&M Plan;
- SAMP;
- QAPP; and
- HASP.

Upon approval of any updated plans by USEPA, the plans shall become a part of corresponding previously approved plans.

6.2 ADDITIONAL INVESTIGATIVE AND FEASIBILITY STUDY TASKS; FURTHER RESPONSE ACTIONS

1. Regardless of the source, if a hazardous substance is detected in a Perimeter Monitoring Network well identified in Section 4.6.1 (excluding converted residential wells and OW421, OW415 or OW418), at or above one-half of an MCL, the Settling Defendants shall resample the well within 90 days unless the Settling Defendants accept the analytical results from the initial sample. If the initial sample results are accepted or if the re-sampling confirms the presence of a hazardous substance at or above one-half of the MCL, the Settling Defendants shall at a minimum re-sample the well every 90 days for no less than one year.
2. Regardless of the source, if any hazardous substance is detected in a residential water supply well at or above one-half of an MCL, the Settling Defendants shall resample the residential water supply well within 10 days unless the Settling Defendants accept the results of the initial sample. If the initial sample results are accepted, or if the re-sampling confirms the presence of the hazardous substance at or above one-half of the applicable MCL, the Settling Defendants shall at a minimum re-sample the well every 90 days for no less than one year.
3. Regardless of the source, if any hazardous substance is detected in a residential water supply well at or above an MCL, the Settling Defendants shall provide bottled water to the affected residence within 10 days of the receipt of the data report and the provision of bottled water shall continue until quarterly sampling

is no longer required under the provisions of 6.2.2, or permanent water is supplied according to the provisions of 6.2.6.

4. Detection and measurement for concentration of vinyl chloride shall be determined by the Settling Defendants' use of method 8260 (for monitoring wells) or 524.2 (for residential wells) in accordance with the testing methods and data validation procedures outlined in the QAPP.

5. If USEPA determines that further investigation or evaluation tasks are needed in order to determine the extent of hazard presented and to evaluate remedial alternatives, USEPA shall discuss the issue with the Settling Defendants, explain why additional investigation and study are needed, and provide a written notice that further investigation or evaluation tasks are needed. The notice shall also require the Settling Defendants to submit a plan and schedule for the additional investigation and evaluation of alternatives as needed. The Settling Defendants shall submit the plan and schedule to USEPA within 30 days of receipt of the written notice. The Settling Defendants shall implement the investigation and study in accordance with the plan and schedule as approved by USEPA. It is the intention of USEPA and the Settling Defendants that Section 6.2.5 shall not expand USEPA's authority under CERCLA and the NCP.

6. If any hazardous substance attributable to the landfill (as depicted on Figure 1.2), as determined by USEPA, exceeds an MCL (calculated pursuant to the compliance requirements of 40 CFR Part 141) in a well used for residential drinking water at a residence that did not previously decline a connection to the public water supply system, the following actions shall be taken by the Settling Defendants:

   a) Within 60 days of any sampling event that causes an exceedance of an MCL, the Settling Defendants shall submit a plan to USEPA for provision of a permanent uncontaminated water supply (provision of water provided by municipal connection, new well or otherwise) for the affected residence. The plan shall include a schedule for its implementation.

   b) The Settling Defendants shall implement the plan as approved by the USEPA.

7. Any dispute regarding USEPA's determination that a hazardous substance detected in a well is attributable to the landfill and any dispute regarding USEPA's review of a proposed plan of action shall be resolved pursuant to Paragraph 67 of the CD. Any plan of action approved by USEPA under this provision shall constitute a response action under CERCLA.

7.0 SCHEDULE

Table 7.1 presents a check list of tasks discussed within this work plan.

7.1 RAWP WORK SCHEDULE

A. Connection to the Wauconda Water Supply System

Submission or Task	*Due Date*
1. Completion of water supply system plans and specifications by the Wauconda engineer.	Phase I completed (watermains, services, and well sealing). Phase II (well and water treatment) to be completed by October 1, 2007.
2. Construction Bidding	Phase I completed. Request for bids for Phase II shall be solicited upon approval of loan(s) by Illinois EPA
3. Pre-Construction Meetings	Completed
4. Initiate Construction	Completed
5. Completion of Construction	Phase I & II: Completed November 2008
6. Install groundwater monitoring wells	Within 180 days after the effective date of the CD
7. Convert residential wells to monitoring wells	Within 180 days after the effective date of the CD
8. Structure Vapor Evaluation	Within 180 days after the effective date of the CD

B. Monitoring Program

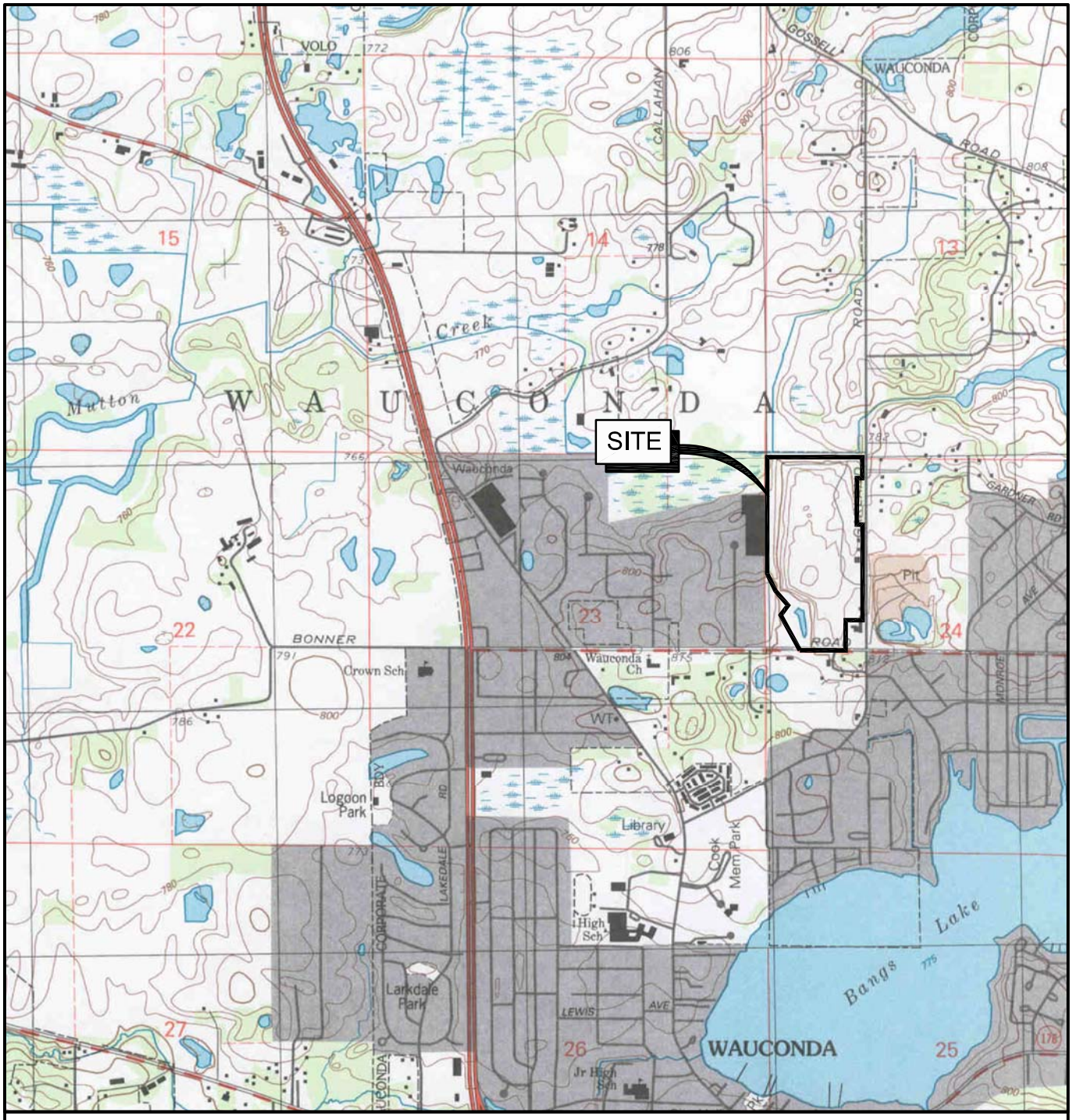
Submission or Task	***Due Date***
1. Monthly Reports	Monthly due the 10th of the month for a period of two years. After two years, USEPA will decide whether to move to quarterly reports.
2. Quarterly Reports	Quarterly by the 10th day of January, April, July, and October of each year for the preceding three month period.
3. Annual Monitoring Report	December 1 each year, covering activities from November 1 of the preceding year to October 31 of the reporting year.
4. Structure Vapor Technical Memorandum	Within 180 days after the effective date of the CD.
5. Hydrogeologic Assessment Report	Within 180 days after the effective date of the CD.
6. Plan Updates	Within 90 days after Settling Defendants' receipt of the 5-year Reviews (as necessary.) The next 5-year review is scheduled for 2007.

8.0 EFFECTIVE DATE OF THE RAWP

The RAWP shall become effective concurrent with the effective date of the CD.

9.0 DURATION

The RAWP shall be effective for 15 years subject to re-evaluation at that time based on the history to determine whether there is a threat to human health or the environment.



SOURCE: USGS 7.5 MINUTE QUAD
WAUCONDA, ILL. QUAD

N

0 1000 2000ft

figure 1.1

SITE LOCATION
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GN-SP001 MAY 12/2005

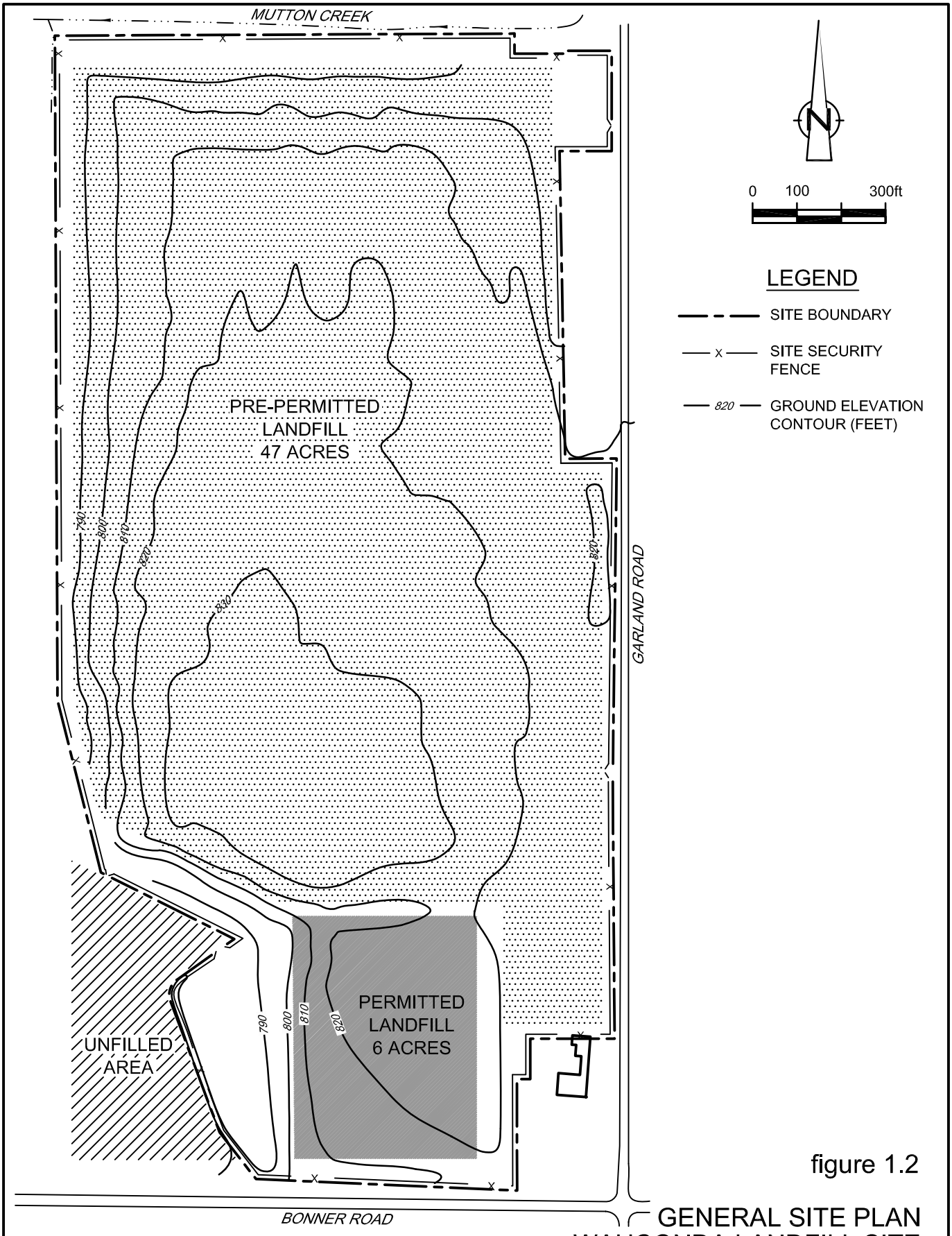
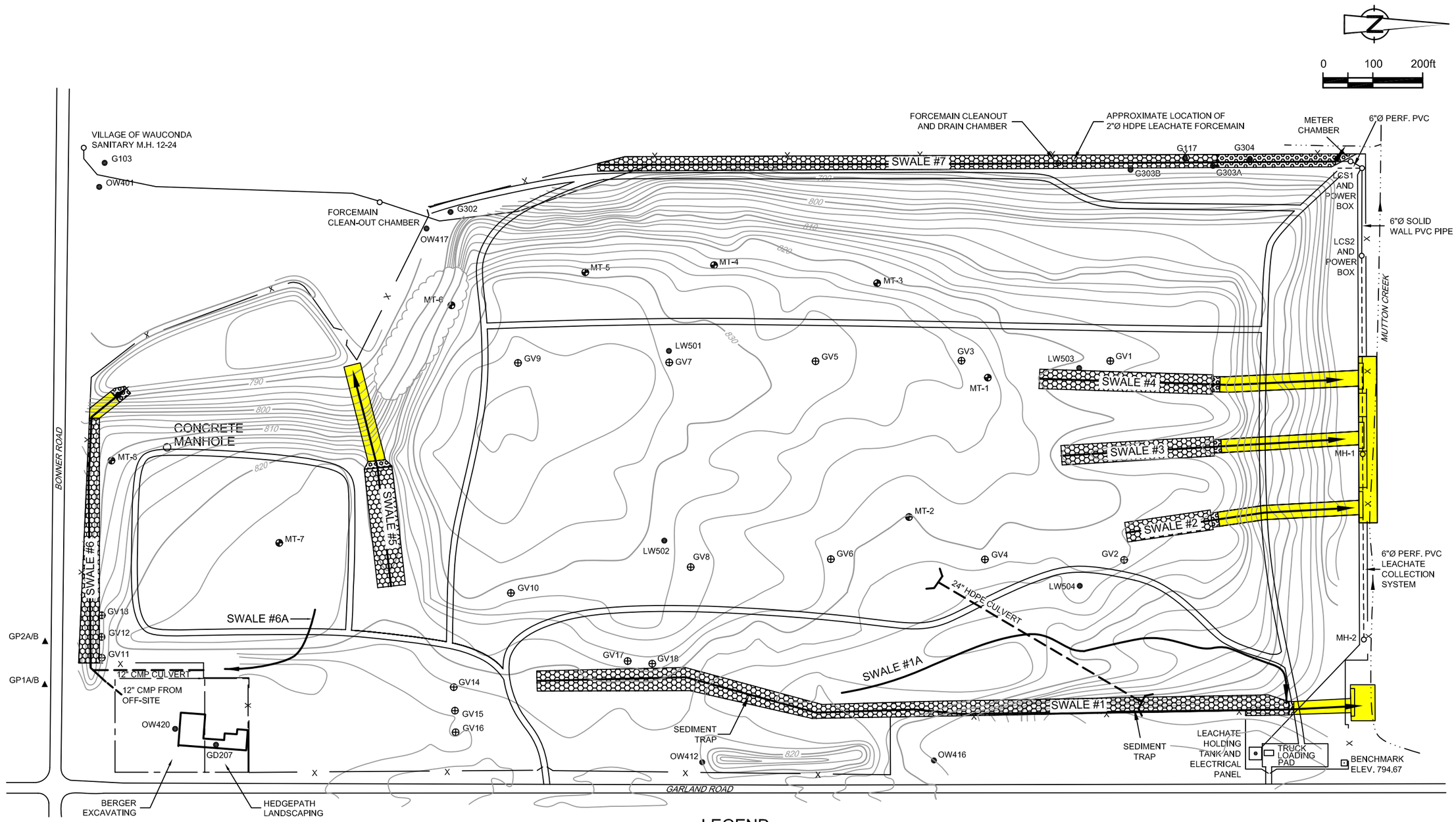


figure 1.2

GENERAL SITE PLAN
WAUCONDA LANDFILL SITE
Wauconda, Illinois

CRA

38038-10(004)GN-SP002 NOV 02/2006



LEGEND

- WELL LOCATION
- GAS VENT LOCATION
- NESTED GAS PROBE LOCATION
- MONUMENT LOCATION
- ENKAMAT LINED CHANNEL
- RIPRAP
- GABION LINED CHANNEL
- APPROXIMATE LOCATION OF SERVICE DRIVES

SOURCE: TOPOGRAPHY BASED ON COMBINATION OF VARIOUS SURVEYS CONDUCTED SINCE 1992.

CRA

figure 1.3

DETAILED SITE PLAN
WAUCONDA LANDFILL SITE
Wauconda, Illinois

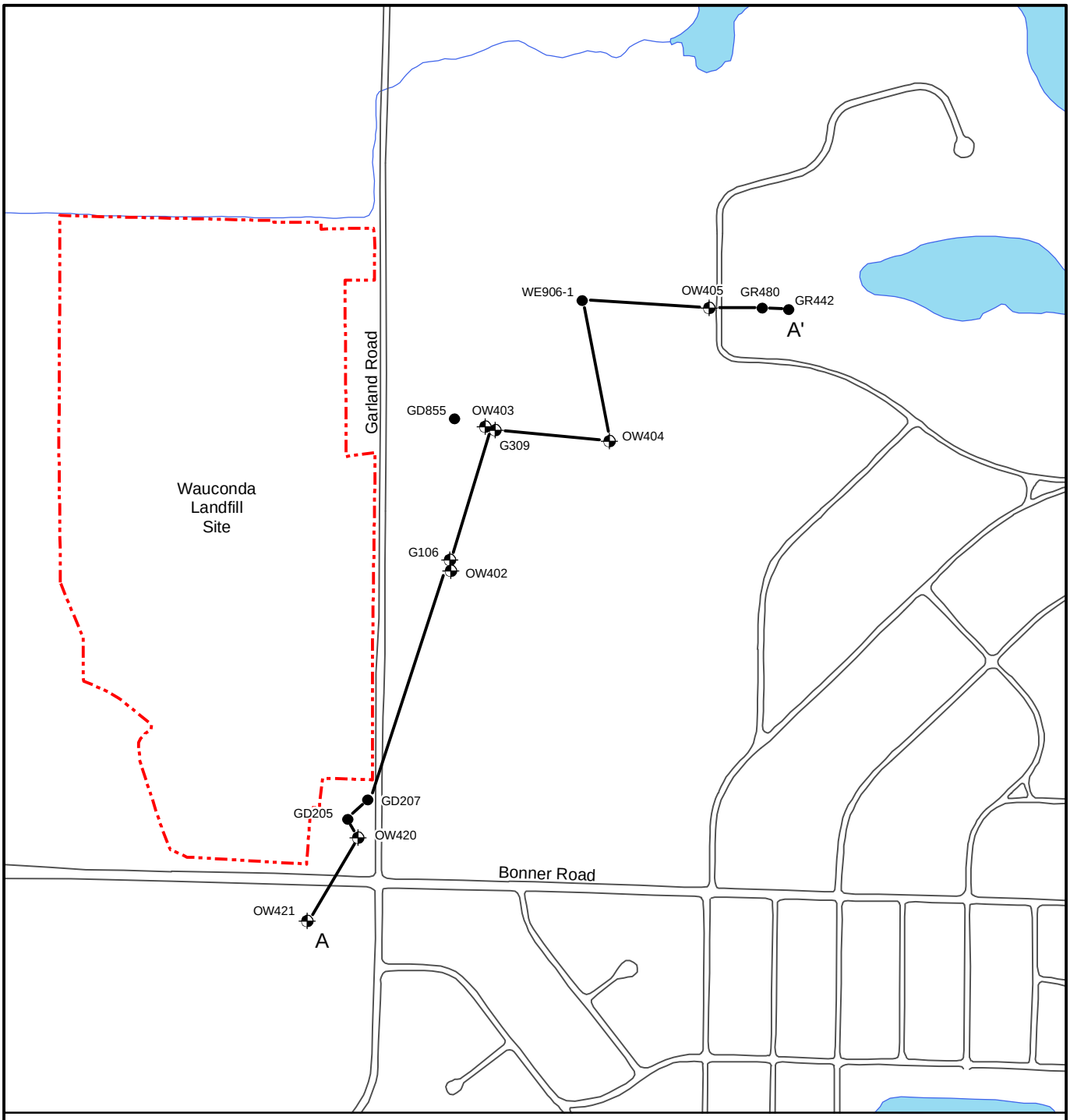
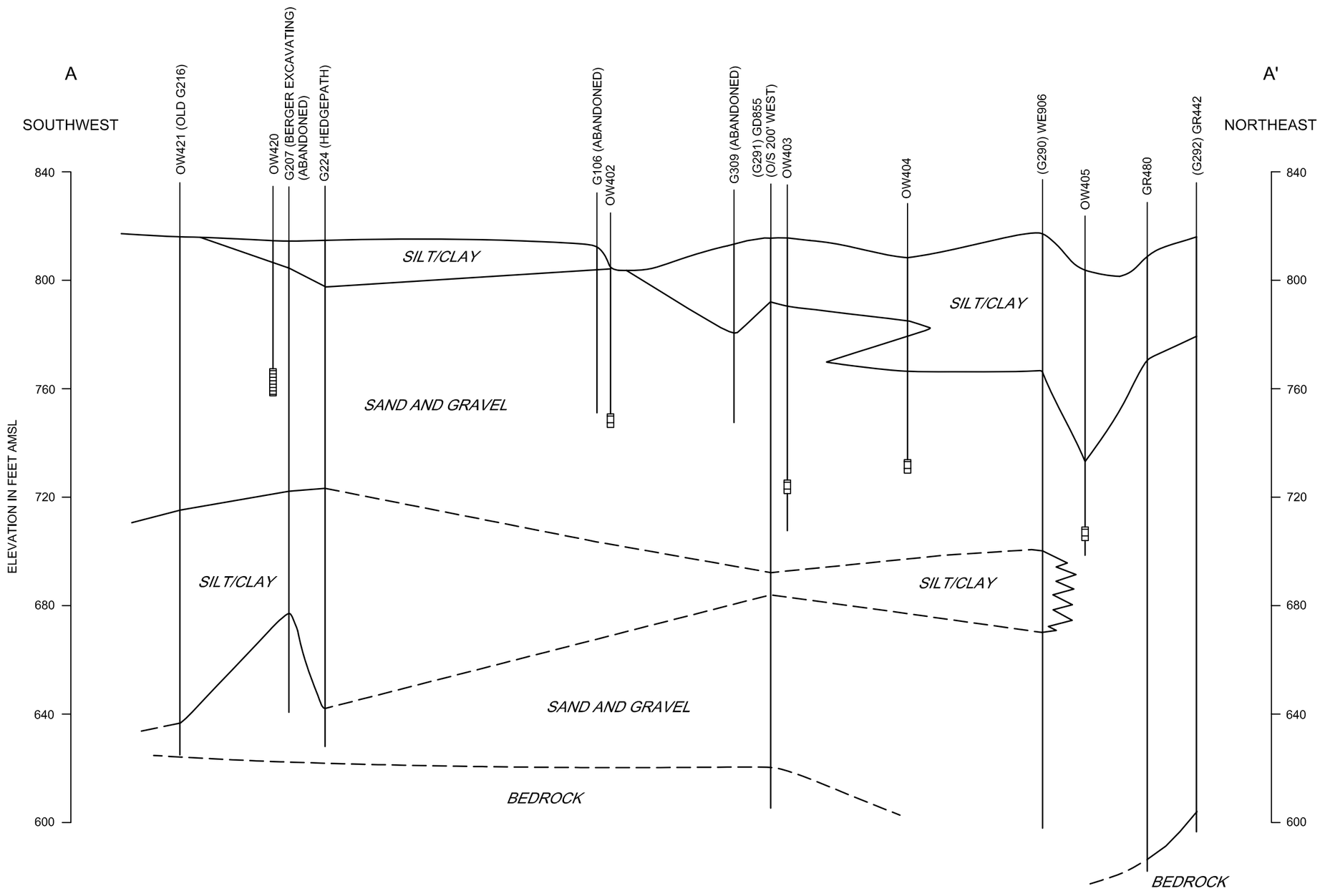


figure 1.4

LOCATION OF GEOLOGIC CROSS SECTION
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GIS-SP001 APR 11/2006



SCALE: 1"=400' HOR., 1"=40' VER.

figure 1.5

GEOLOGIC CROSS SECTION A-A'
WAUCONDA LANDFILL SITE
Wauconda, Illinois

NOTE: GEOLOGIC CROSS SECTION DEVELOPED FROM WELL DRILLER LOGS AND MAY NOT ACCURATELY REFLECT CONDITIONS.

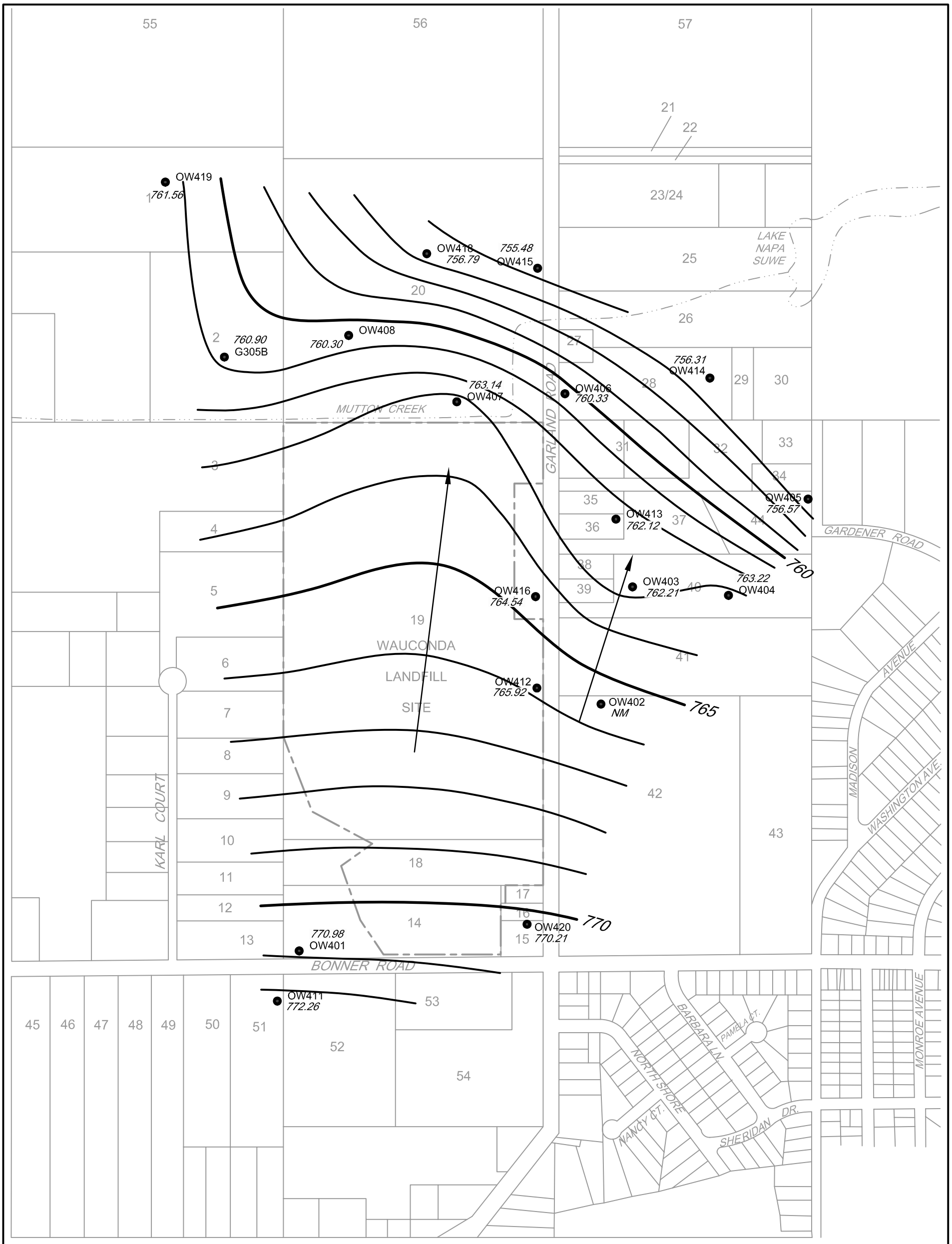


figure 1.6

UPPER AQUIFER GROUNDWATER CONTOURS
(AUGUST 2004)
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GN-SP006 APR 11/2006

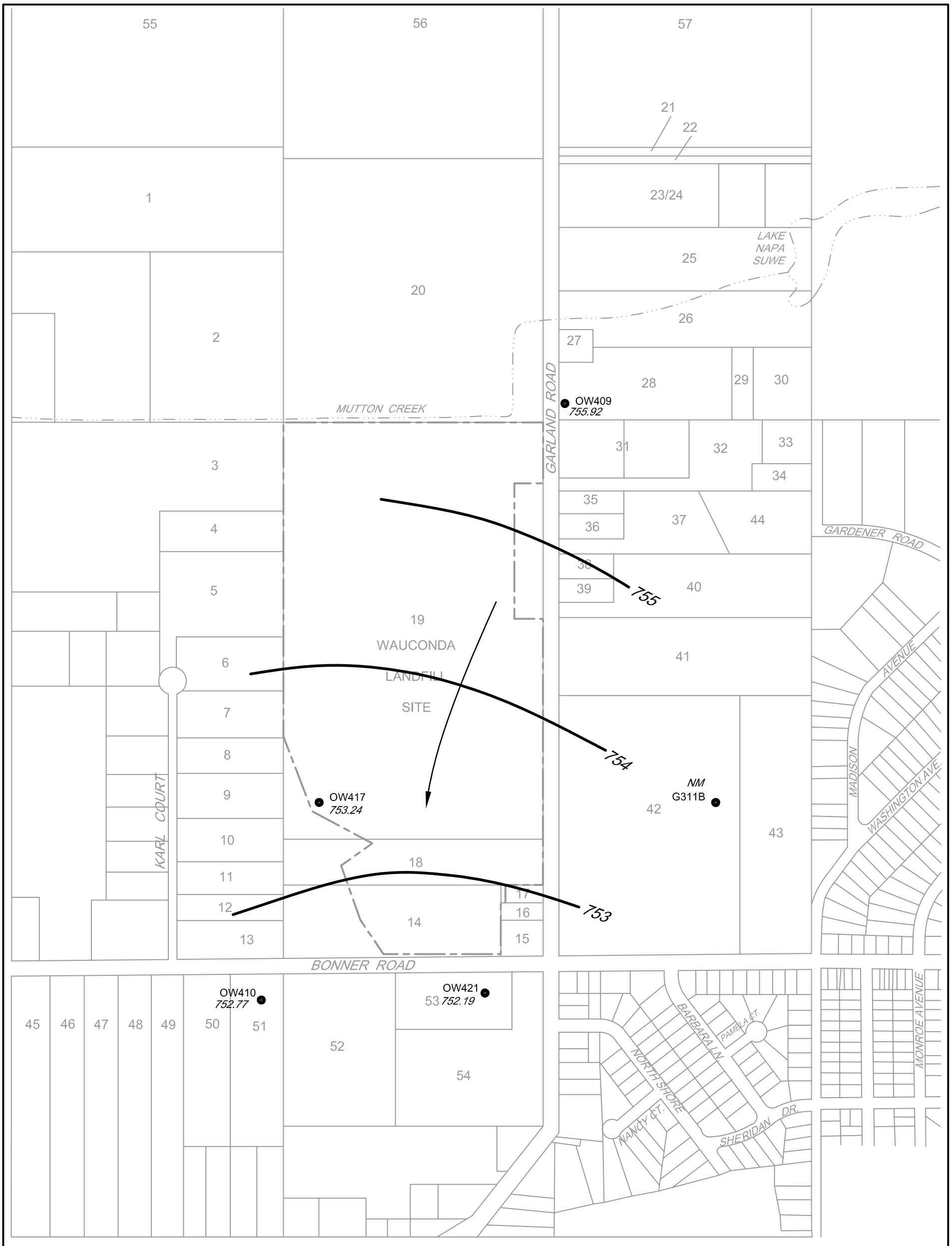
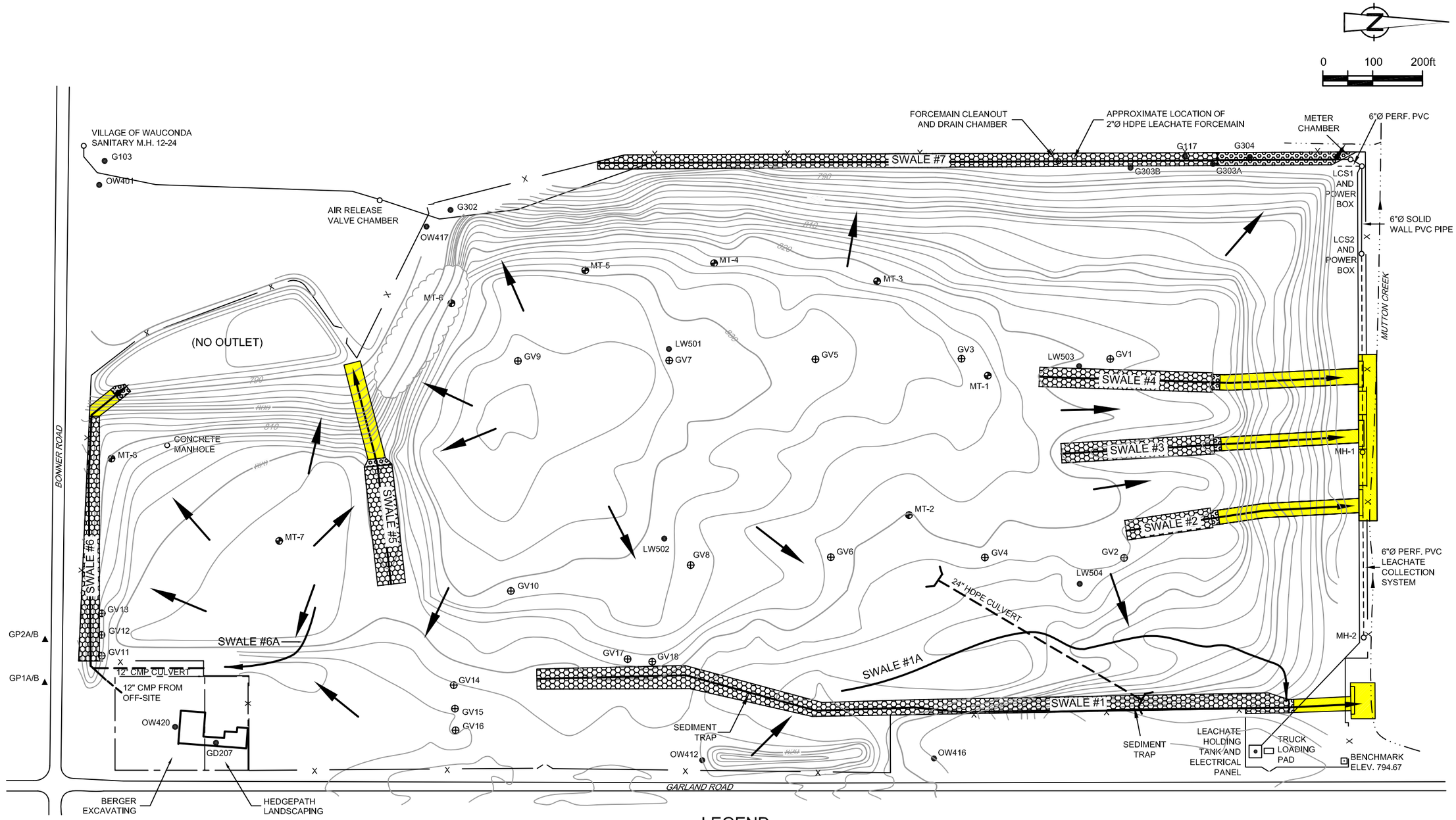


figure 1.7

LOWER AQUIFER GROUNDWATER CONTOURS
(AUGUST 2004)
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GN-SP007 APR 11/2006



LEGEND

- WELL LOCATION
- GAS VENT LOCATION
- NESTED GAS PROBE LOCATION
- MONUMENT LOCATION
- ENKAMAT LINED CHANNEL
- RIPRAP
- GABION LINED CHANNEL
- DRAINAGE FLOW

SOURCE: TOPOGRAPHY BASED ON COMBINATION OF VARIOUS SURVEYS CONDUCTED SINCE 1992.

figure 1.8

SURFACE DRAINAGE FLOW PATTERNS
WAUCONDA LANDFILL SITE
Wauconda, Illinois

CRA

38038-10(004)GN-SP008 APR 11/2006

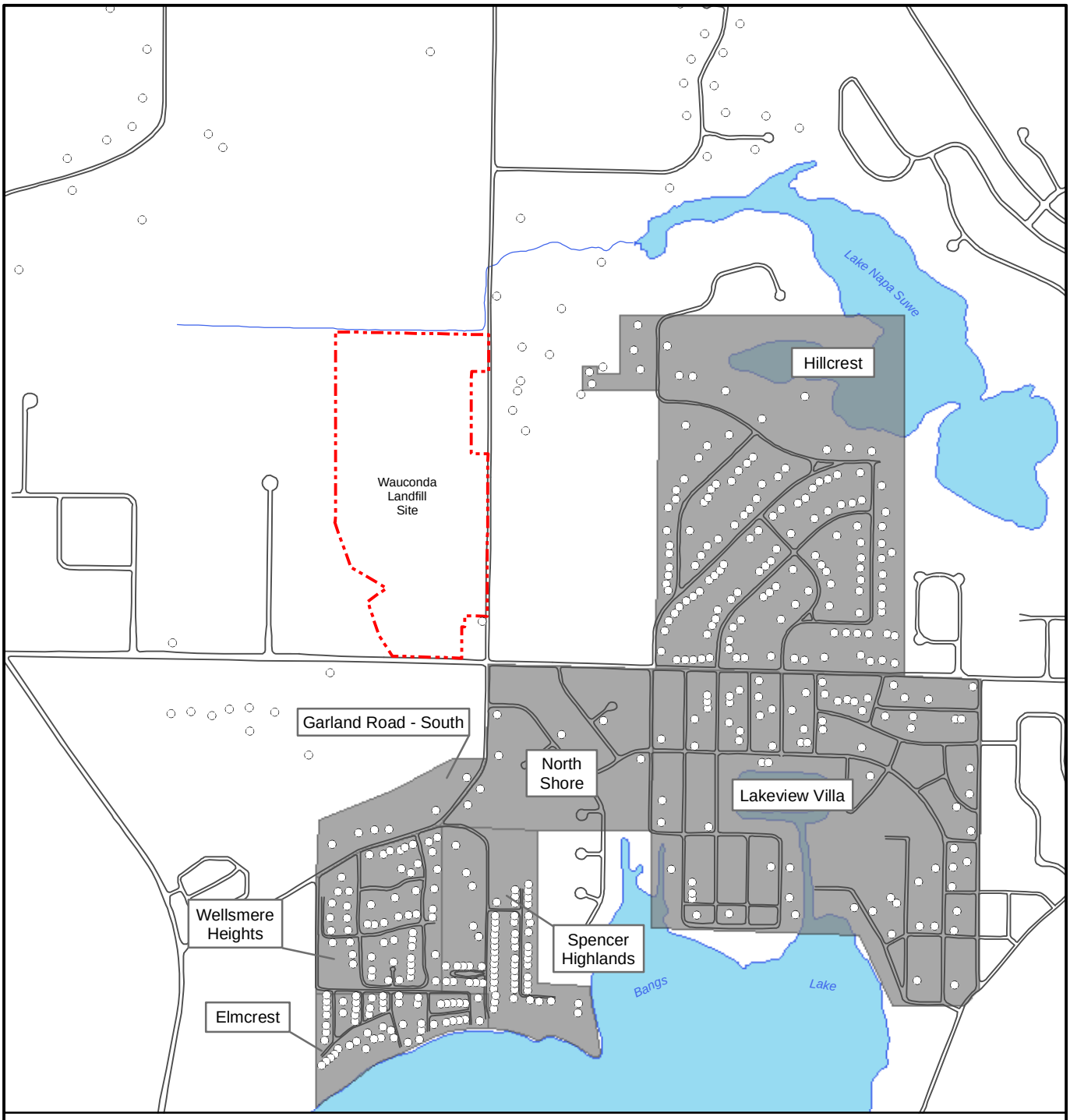
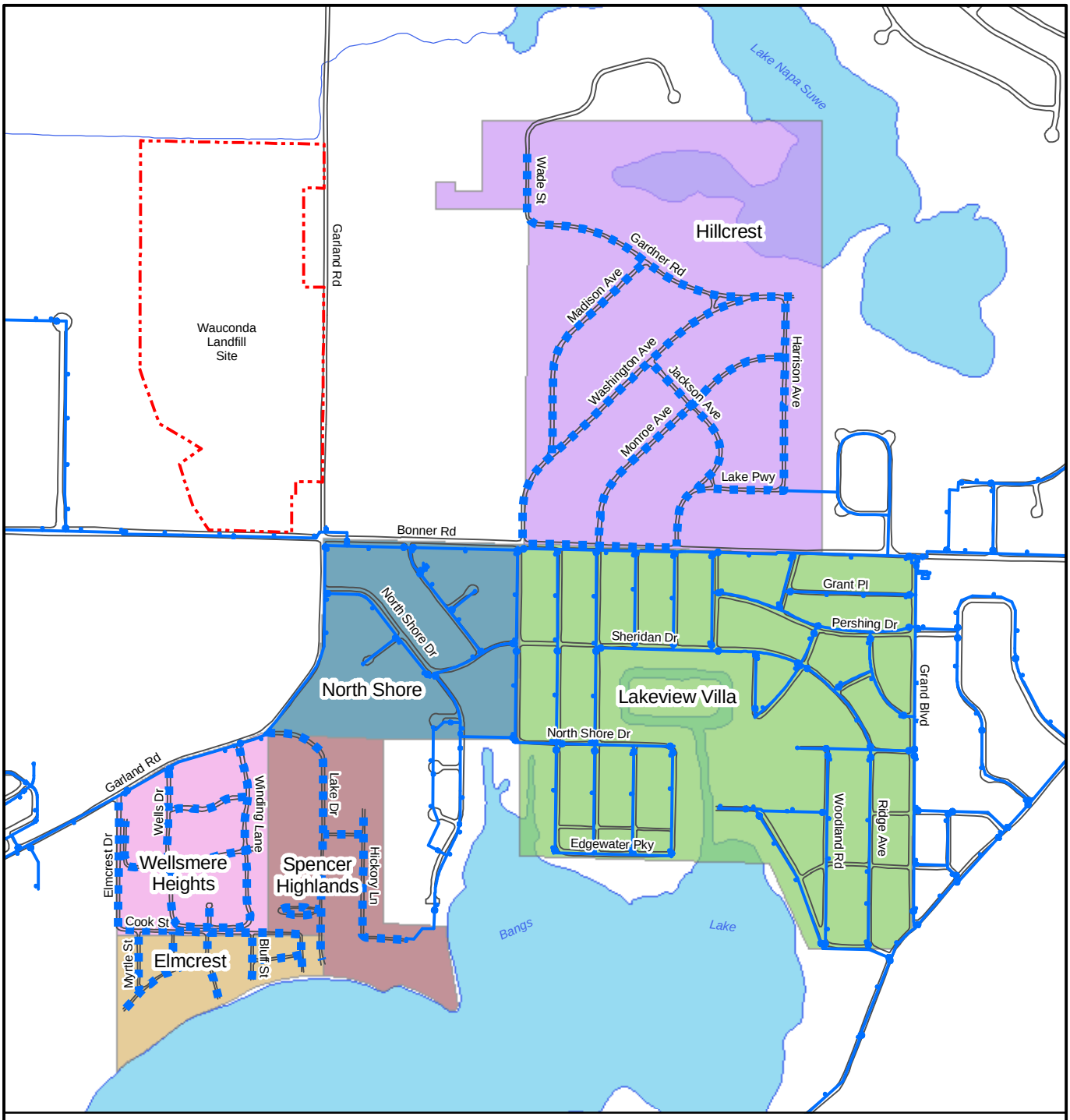


figure 3.1

PUBLIC WATER SUPPLY SERVICE AREA
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GIS-SP002 OCT 11/2005



LEGEND

- PROPOSED WATER MAINS
- WATER MAINS
- ELMCREST SUBDIVISION
- WELLSMERE HEIGHTS SUBDIVISION
- NORTH SHORE SUBDIVISION
- LAKEVIEW VILLA SUBDIVISION
- HILLCREST SUBDIVISION
- SPENCER HIGHLANDS SUBDIVISION

N

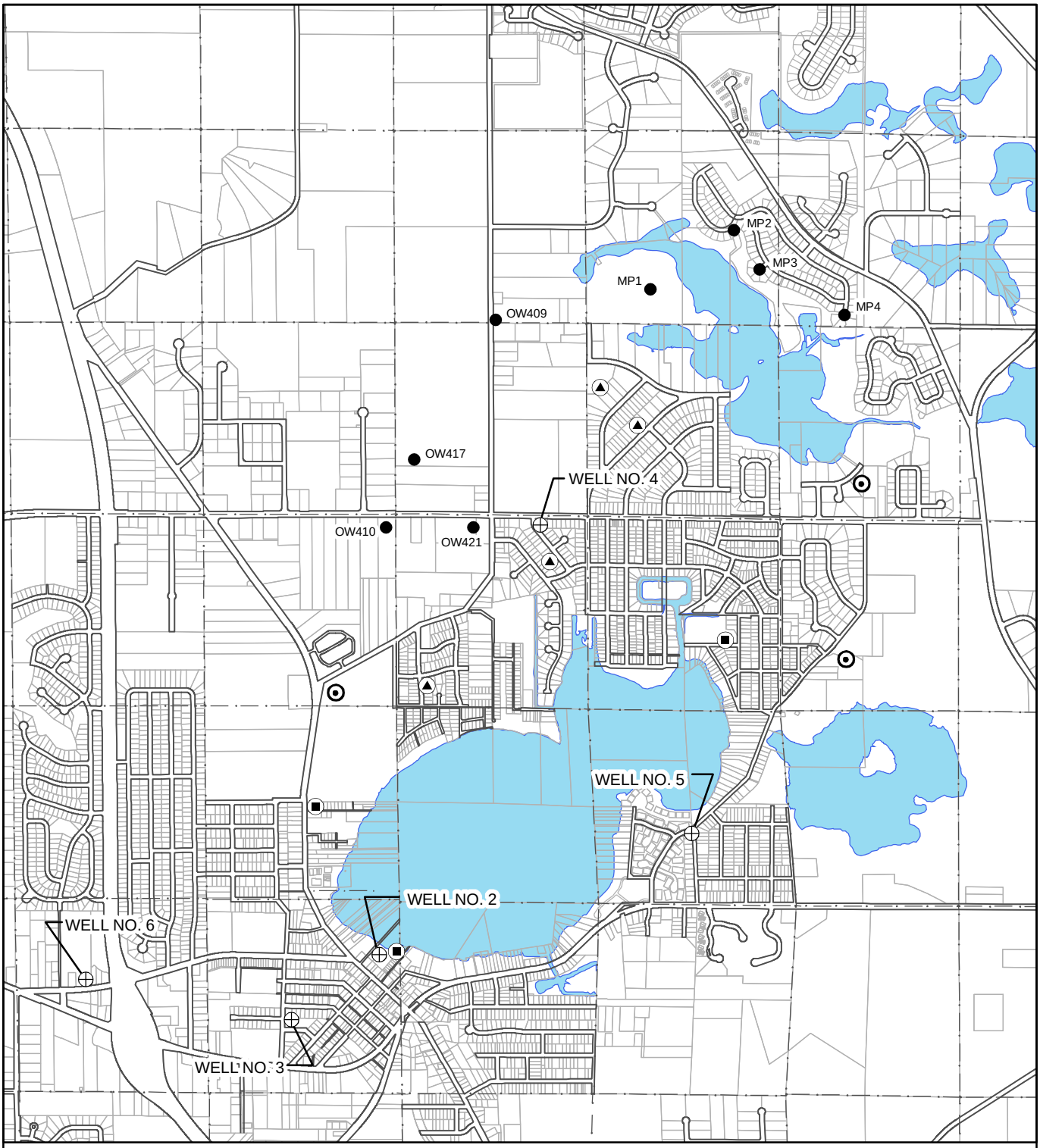
0 500 1,000

Feet

figure 3.2

PUBLIC WATER SUPPLY SYSTEM
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GIS-SP003 OCT 11/2005



LEGEND

PERIMETER MONITORING NETWORK

- PROPOSED VERTICAL AQUIFER PROFILE / LOWER AQUIFER MONITORING WELL
- PROPOSED LOWER AQUIFER MONITORING WELL
- LOWER AQUIFER MONITORING WELL
- PROPOSED CONVERTED RESIDENTIAL WELL

OTHER

- PUBLIC WELL

N

0 1,000 2,000

Feet

NOTE: LOCATIONS OF PROPOSED WELLS MAY CHANGE BASED UPON THE RESULTS OF THE WATER LEVEL MONITORING

figure 4.1

PERIMETER MONITORING NETWORK
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GIS-SP004 APR 11/2006

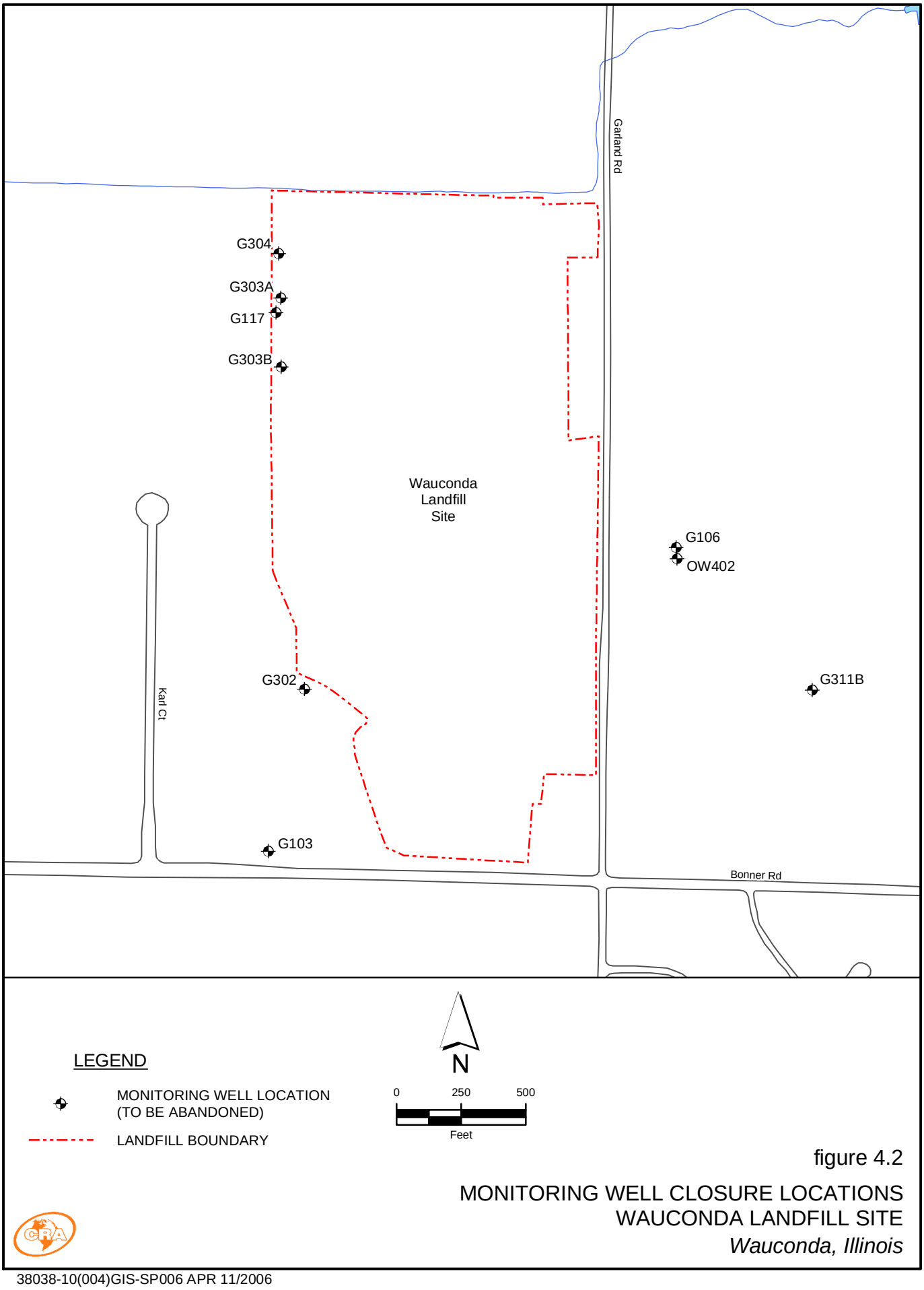
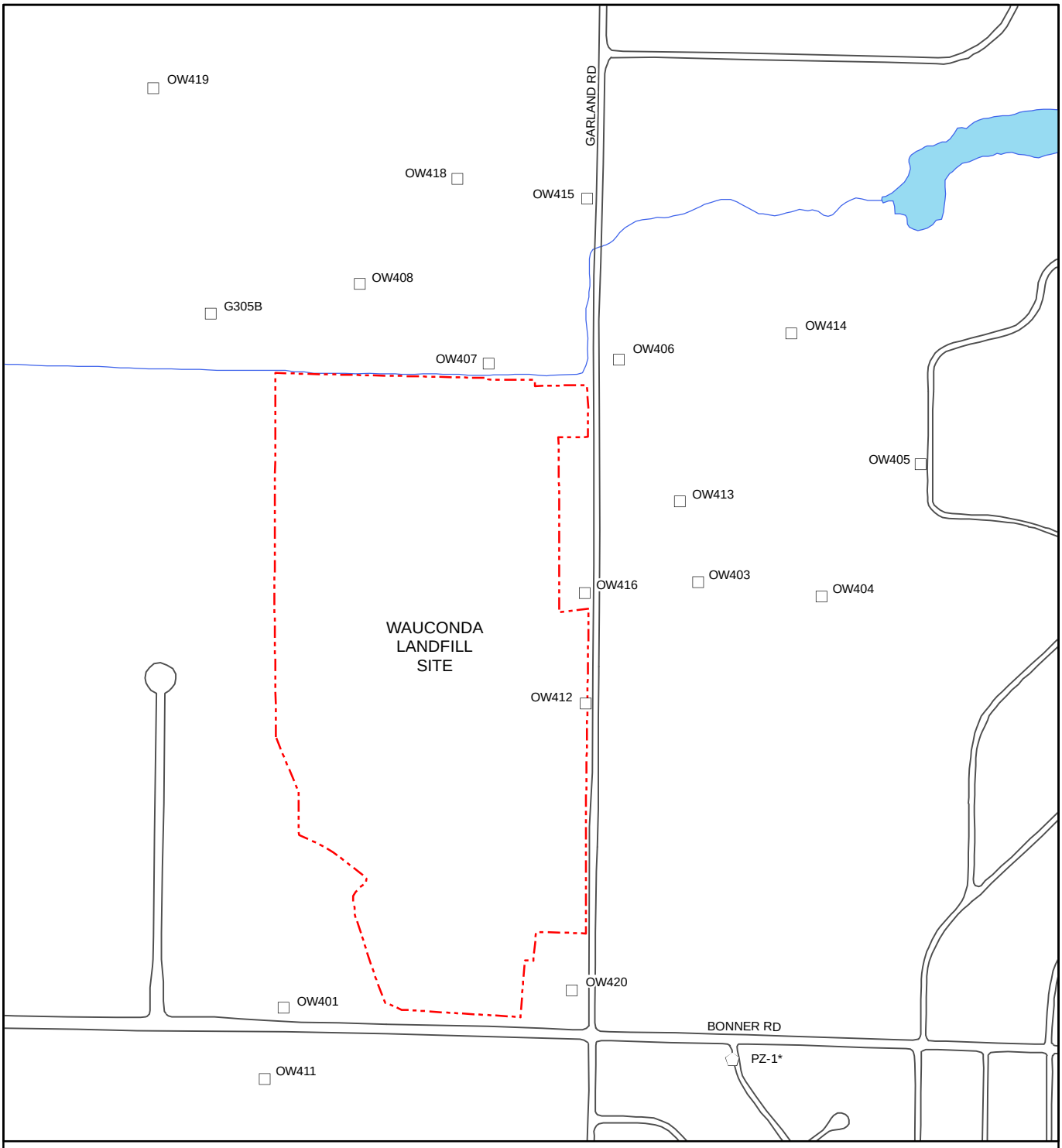


figure 4.2

MONITORING WELL CLOSURE LOCATIONS
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GIS-SP006 APR 11/2006



LEGEND

- UPPER AQUIFER MONITORING WELL
- PIEZOMETER LOCATION
- * WATER LEVELS ONLY
- LANDFILL BOUNDARY

N

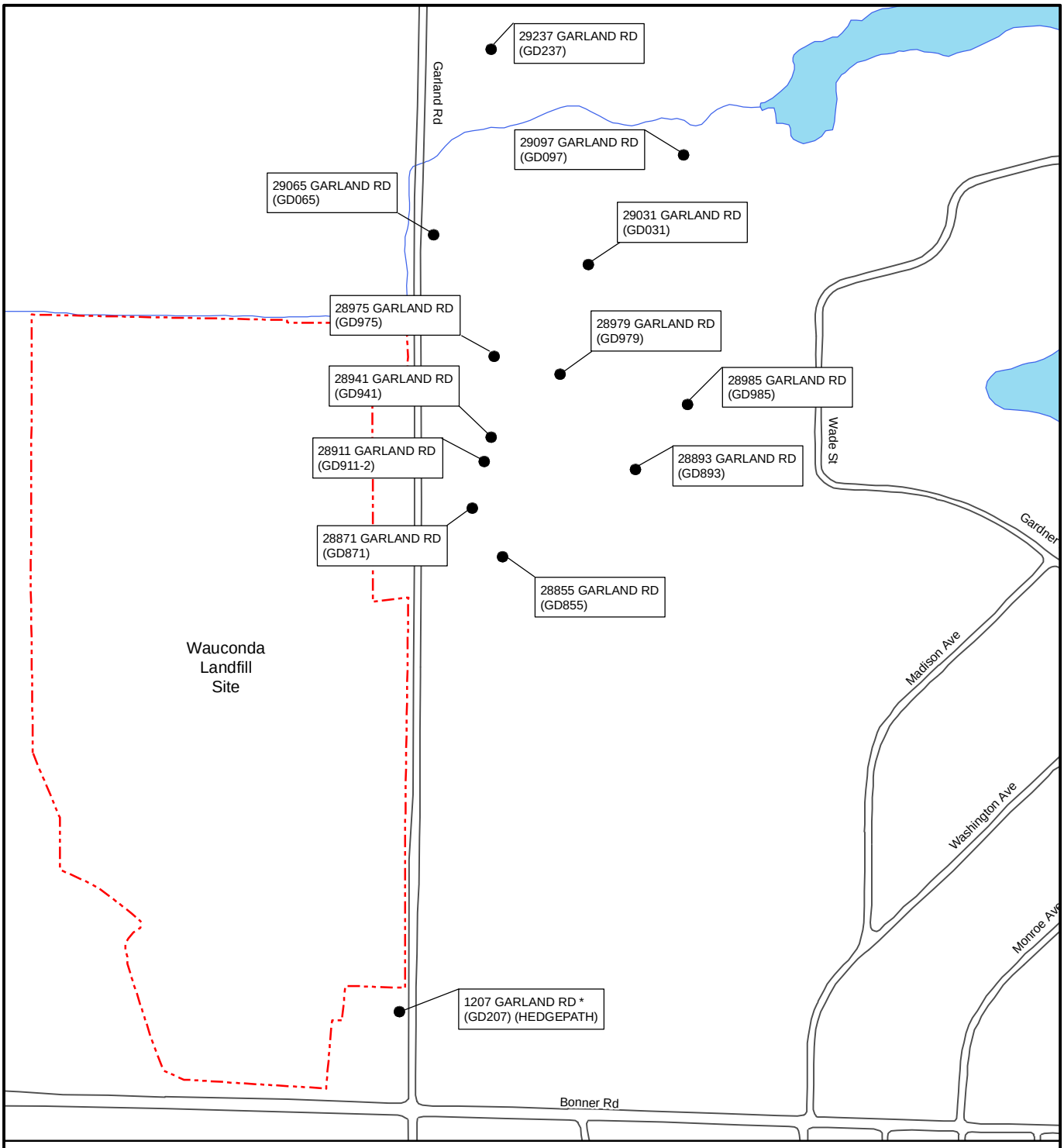
0 300 600

Feet

figure 4.3

UPPER AQUIFER GROUNDWATER MONITORING NETWORK
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GIS-SP007 APR 11/2006



LEGEND

- RESIDENTIAL WELL LOCATION
- * GD207 IS SAMPLED QUARTERLY UNDER A SEPARATE PROGRAM
- LANDFILL BOUNDARY

N

0 250 500

Feet

figure 4.4

GARLAND ROAD - NORTH SAMPLING PROGRAM
WAUCONDA LANDFILL SITE
Wauconda, Illinois

38038-10(004)GIS-SP005 APR 11/2006

TABLE 4.1

5-YEAR GROUNDWATER MONITORING PROGRAM
WAUCONDA LANDFILL
WAUCONDA, ILLINOIS

Sampling Location	*GWE*	*VOCs*	*Metals*	*GWQP*	*MNA*	*Frequency*
Perimeter Monitoring Network						
1 Lower Aquifer new installed well	X	X				Quarterly (Y1/Y2) [a]
1 Lower Aquifer new installed well	X	X				Quarterly (Y1/Y2) [a]
1 Lower Aquifer new installed well	X	X				Quarterly (Y1/Y2) [a]
1 Lower Aquifer new installed well	X	X			X	Quarterly (Y1/Y2) [a]
1 Lower Aquifer new installed well	X	X			X	Quarterly (Y1/Y2) [a]
1 Lower Aquifer new installed well	X	X			X	Quarterly (Y1/Y2) [a]
1 converted residential well	X	X			X	Quarterly (Y1/Y2) [a]
1 converted residential well	X	X			X	Quarterly (Y1/Y2) [a]
1 converted residential well	X	X			X	Quarterly (Y1/Y2) [a]
1 converted residential well	X	X			X	Quarterly (Y1/Y2) [a]
OW409	X	X			X	Quarterly (Y1/Y2) [a]
OW410	X	X			X	Quarterly (Y1/Y2) [a]
OW417	X	X			X	Quarterly (Y1/Y2) [a]
OW421	X	X			X	Quarterly (Y1/Y2) [a]
MP1	X	X			X	Quarterly (Y1/Y2) [a]
MP2	X	X			X	Quarterly (Y1/Y2) [a]
MP3	X	X			X	Quarterly (Y1/Y2) [a]
MP4	X	X			X	Quarterly (Y1/Y2) [a]
Upper Aquifer Monitoring Network						
G305B	X	X		X		Annually (Y1/Y2) [a]
OW401	X					Annually (Y1/Y2) [a]
OW403	X					Annually (Y1/Y2) [a]
OW404	X					Annually (Y1/Y2) [a]
OW405	X					Annually (Y1/Y2) [a]
OW406	X	X		X	X	Annually (Y1/Y2) [a]
OW407	X	X		X		Annually (Y1/Y2) [a]
OW408	X	X		X	X	Annually (Y1/Y2) [a]
OW411	X					Annually (Y1/Y2) [a]
OW412	X	X		X		Annually (Y1/Y2) [a]
OW413	X	X	X	X		Annually (Y1/Y2) [a]
OW414	X					Annually (Y1/Y2) [a]
OW415	X	X		X	X	Annually (Y1/Y2) [a]
OW416	X	X		X	X	Annually (Y1/Y2) [a]
OW418	X	X		X		Annually (Y1/Y2) [a]
OW419	X					Annually (Y1/Y2) [a]
OW420	X	X		X		Annually (Y1/Y2) [a]
PZ-1	X					Annually (Y1/Y2) [a]

TABLE 4.1

5-YEAR GROUNDWATER MONITORING PROGRAM
WAUCONDA LANDFILL
WAUCONDA, ILLINOIS

Sampling Location	*GWE*	*VOCs*	*Metals*	*GWQP*	*MNA*	*Frequency*
Residential Wells			d			
GD855		X		X		Annually [b]
GD871		X		X		Annually [b]
GD893		X		X		Annually [b]
GD911		X		X		Annually [b]
GD941		X		X		Annually [b]
GD975		X		X		Annually [b]
GD979		X		X		Annually [b]
GD985		X		X		Annually [b]
GD031		X		X		Annually [b]
GD065		X		X		Annually [b]
GD237		X		X		Annually [b]
GD097		X		X		Annually [b]
5 residential wells [c]		X		X		Annually [b]
Hedgepath Well						
GD207		X				Semi-Annually for 5 years

Notes:

Specific analytical parameters and methods are presented in the Sampling, Analysis, and Monitoring Plan

GWE - groundwater elevation

VOCs - volatile organic compounds

GWQP - general water quality parameters

MNA - monitored natural attenuation parameters

a - USEPA will determine scope/frequency after year 2 and year 5.

b - 3 of the 12 wells will be sampled each quarter such that the wells are sampled once each year over the 5-year monitoring period

c - up to 5 additional residential wells, selected by USEPA, will be sampled on an annual basis in conjunction with the Perimeter Monitoring Network sampling

d - USEPA will select 3 residential wells each year for metals analysis.

TABLE 7.1

FREQUENCY OF VARIOUS TASKS
WAUCONDA LANDFILL
WAUCONDA, ILLINOIS

Task	*1 Time*	*Monthly*	*Quarterly*	*Semi-annual*	*Annual*	*Comments*
2.0 Remedial and Other Response Actions						
2.1 Cap inspection		X				Inspection by site custodian
2.1 Cap inspection			X			Inspection by CRA
2.1 Detailed cap inspection				X		Early spring and late summer
2.2 LCS operation and flow						3 times per week
2.2 LCS storage area inspection			X			
2.2 LCS inspection			X		X	
2.3.1 Passive gas vent system					X	
2.3.2 Soil gas probes		X				
2.3.3 Combustible gas monitors					X	
2.4 Monitoring well inspection						Whenever wells are sampled
4.0 Groundwater Monitoring						
4.1 Pre- & post-hook up surveys	X					Pre- is done, post- 90 days after hook-up
4.1 Transition monitoring	X					
4.1 Periodic elevation surveys	X				X	Two to three times in 2006. Annually thereafter
4.2 Vertical aquifer profiling	X					
4.3 New well installation	X					
4.4 Well depth and DTW	X					Prior to well closure
4.4 Geophysical logging	X					
4.4 Single well response test	X					
4.5 Well closures	X					
4.6.1 Perimeter monitoring network			X			Reevaluate frequency after 2 years and again after 5 years
4.6.2 Upper aquifer monitoring network					X	Reevaluate frequency after 2 years and again after 5 years
4.6.3 Residential well monitoring			X		X	North Garland-Quarterly, selected wells annually
4.6.3 Hedgepath monitoring				X		Reevaluate frequency after 5 years
4.6.3 Res wells in service area	X					
4.7 Mutton Creek						As needed, if leachate seeps observed
4.8.1 Landfill leachate level monitoring		X				
4.8.2 LCS leachate monitoring			X			Quarterly according to O&M Plan
4.9 Soil gas monitoring		X				Combustible gas and pressure
4.10 Structure vapor evaluation	X					
5.0 Reporting						
5.1 Remedial Action Completion Report	X					
5.2 Hydrogeologic Assessment Report	X					180 days after CD
5.3 Structure Vapor Evaluation Report	X					180 days after CD
5.4 Leachate monitoring reporting	X					To be included in "progress" and annual reports
5.5 Monthly reports		X				Evaluate after 2 years
5.6 Quarterly progress reports			X			
5.7 Annual monitoring reports					X	